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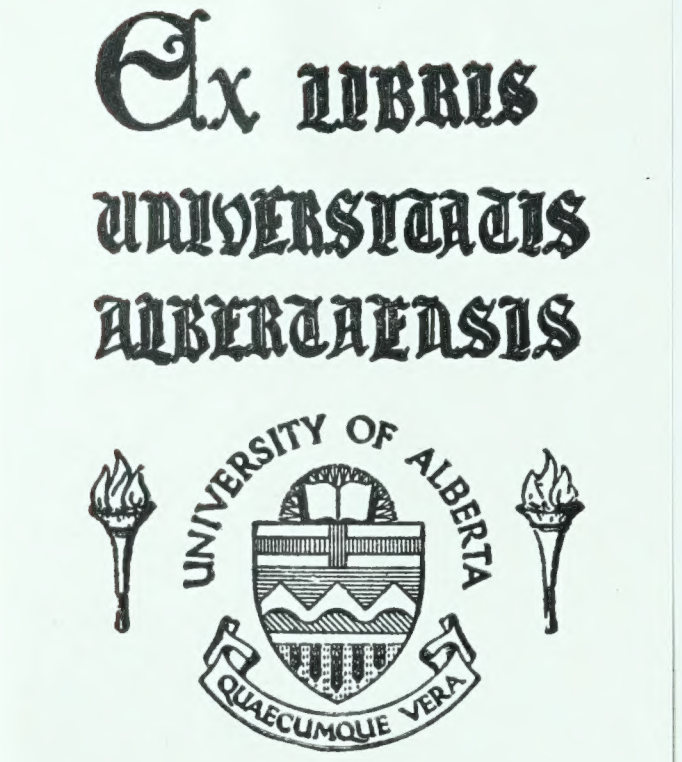

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THE UNIVERSITY OF ALBERTA

A SEMANTIC DIFFERENTIAL ANALYSIS OF THE CONCEPT SCHOOL

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DIVISION OF EDUCATIONAL PSYCHOLOGY

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UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "A Semantic Differential Analysis of the Concept School" submitted by Mervyn Norman Guy Eastman in partial fulfillment of the requirements for the degree of Master of Education.

SUMMARY

A SEMANTIC DIFFERENTIAL ANALYSIS OF THE CONCEPT SCHOOL

A measure of the meaning of the concept SCHOOL was obtained for three student groups by the use of a semantic differential. The distinctive factors or dimensions of meaning operative in each meaning were isolated, identified, and their relative importance measured.

The results indicated that a predominantly Evaluative dimension or characteristic attribute was present in the meanings from all three groups, and that the meaning of SCHOOL was contained within this general frame of reference.

Distinctive quantitative and qualitative differences appeared in the semantic structures of the three groups. The most characteristic variation had to do with the number of significant factors which determined the meaning in each group.

Subjects in the youngest, Grade IX, group expressed 72% of all variation in meaning by the use of eleven factors, and the first three of these factors accounted for 41% of the total variance. Subjects in the Grade XI group expressed 67% of the variance in meaning by the use of twelve factors, and the first three of these factors accounted for 37%. Subjects in the oldest group, composed of University students, utilized thirteen factors to express 70% of all variation in meaning, and the first three of these factors accounted for 35% of the total.

It is apparent that meaning in the youngest group is tightly structured about a few prime factors, and that as persons grow older the relative importance of these factors changes and other new factors are added to the meaning structure.

In summary, the meaning of the concept SCHOOL undergoes a progressive and measureable quantitative and qualitative change from Junior High School to University.

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CHAPTER I

INTRODUCTION TO THE PROBLEM

I. INTRODUCTION

In recent years persons in the teaching profession have become acutely aware of, and concerned about, public attitudes toward the school. The concern is greater now than at any time in the past largely because in the recent and current efforts to improve the status of the profession, teachers have realized their need for sympathetic and appreciative recognition from the general public.

There is therefore a need for specific knowledge of public attitudes which could assist teachers in the evaluation of professional aims and objectives, and which might provide a basis for appraising the degree to which such aims are being realized. Such facts might also indicate the direction and degree of modification, improvement, or emphasis which may be required of particular objectives.

Teachers also recognize that parental and adult attitudes are reflected in the student and therefore have significance for the teacher in matters of general approach to the teaching situation. Undoubtedly, attitudes toward the school will affect teacher-student relationships and thus they may indicate a need for revaluation of teaching roles and methods.

The present study is an attempt to analyze, measure, and describe student attitudes expressed concerning the SCHOOL. It

differs from many other attitude studies conducted within the schools in two important ways. First, most other studies have been restricted to specific learning situations--i.e., typically they attempt to answer the following question: "what is the effect of attitude 'A' on the learning of subject 'X'." The present study is not so restricted but is perhaps more basic and general by comparison.

The second difference is found in the measuring instrument used. Whereas most other attitude studies have used a standard published form of rating scale, alternative response, or other short answer objective tests, this study uses a form of the semantic differential. The semantic differential provides a technique for measuring the essential meaning of a concept through a combination of controlled association and scaling procedures.

To some extent this study is original in its subject matter, its method, and its overall conception. As a consequence, it will be largely exploratory and descriptive in nature.

II. THE PROBLEM OF ATTITUDE MEASUREMENT

The analysis of attitudes expressed toward the public school resolves into a problem of the definition, through the description and measurement, of the meaning of the concept school. If this definition can be made in such a way as to show the many and varied facets and nuances of the meaning then one may begin to make some statements about the attitudes embodied in such a meaning.

The question may therefore be stated as follows: "What does the concept 'school' mean to the population under study?" The answer in turn is provided through the use of the semantic differential technique of measurement.

III. THE RESEARCH PROBLEM

The problem of this study is to discover what the concept SCHOOL means to students. The assumption is made that meaning, and to some extent attitudes, develop within a framework of a few principal dimensions and that these dimensions may be isolated, identified, measured, and described.

The research technique involves the administration of a semantic differential to sample groups of high school and university students, and determining from the results what the dimensions of meaning are for each group. The nature and relative importance of each dimension is obtained. Trends in the use of the various dimensions are observed, and a general conception of the meaning of SCHOOL is determined.

CHAPTER II

THE LOGIC OF SEMANTIC DIFFERENTIATION AND THE SEMANTIC DIFFERENTIAL[1]

Few systematic attempts have been made to measure meaning in a quantitative manner; and there are good reasons for this. First, meaning connotes something non-material and therefore refers to an implicit process or state which must be inferred from observables. Secondly, meaning is undoubtedly so complex that it is often philosophically considered to be uniquely and infinitely varied.

However none of the above implies that social scientists deny the practical or philosophical significance of meaning. Indeed, meaning (whether it be termed 'attitude', or 'value', or something else), and change in meaning, is one of the most important elements in social activity and in human behavior generally. How a person reacts in a situation will depend upon what that situation means in terms of the dimensions which are available to him.

The problem of meaning in behavior is not greatly different from, nor more difficult than, the problem of other psychological variables like emotion or intelligence. As a variable it is useful to the extent that it can be integrated, conceptually and empirically, with existing theory, and indexed quantitatively.

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[1]Charles E. Osgood, George J. Suci, and Percy H. Tannenbaum, The Measurement of Meaning, Urbana, University of Illinois, 1957, Chap. 1-4.

I. THE MEANING OF "MEANING"

There are as many meanings of "meaning" as there are disciplines which deal with language. Each determination corresponds more or less with the purposes and techniques of the individual formulating the meaning. Anthropologists, sociologists, linguists, philosophers, psychologists, and others, have evolved their own characteristic definitions.

Philosophers and psychologists tend to be most interested in semantic meaning--i.e., the relation of signs to their significates. The psychologist is, typically, concerned about the role of the organism's behavior system in mediating the relation between signs and significates. He is specifically interested in defining the distinctive mediational process or state which is hypothesized to occur in the organism whenever a sign is received (decoded) or produced (encoded).

The problem inherent in the semantic definition of meaning is that the "pattern of stimulation which is a sign is never identical with the pattern of stimulation which is the significate...(yet)...the sign...does come to elicit behaviors which are in some manner relevant to the significate."[2] Therefore, the question is: under what conditions does a stimulus which is not the significate itself become a sign of that significate?

Psychologists differ in their views on the problem. Their different views take three major forms described as Mentalist or Dualistic, Substitutional, and Dispositional.[3]

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[2] Ibid., pp. 3-4.

[3] Ibid., pp. 4-5.

It is not the purpose of this treatise to explore the variations in these points of view, nevertheless, the following conception of the sign-process may be viewed as an attempt to make more explicit the behavioral nature of so-called "dispositions."

Certain stimulus patterns have a 'wired-in' connection with certain behavior patterns (unconditioned reflexes) and additional stimuli have acquired this capacity (conditioned reflexes). All these stimuli, which in a given situation, regularly and reliably produce a predictable pattern of behavior are known as significates.

In the naive organism there are many stimuli which do not have this capacity, and the question is, how can such initially meaningless stimuli become meaningful signs for the organism affected by them?

Many studies of the conditioning process combine to support the following conclusion: "whenever some stimulus other than the significate is contiguous with the significate, it will acquire an increment of association with some portion of the total behavior elicited by the significate as a representational mediation process."[4]

As diagrammed in Figure 1, "this stimulus-producing process ($r_m \rightarrow s_m$) is <u>representational</u> because it is part of the same behavior (R_T) produced by the significate ($\dot{s}$)--thus...buzzer becomes a sign ($\boxed{s}$) of shock ($\dot{s}$) rather than a sign of any of a multitude of other things. It is <u>mediational</u> because the self-stimulation (s_m) produced by making this short-circuited reaction can now become associated with a variety

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[4] <u>Ibid</u>., p. 6.

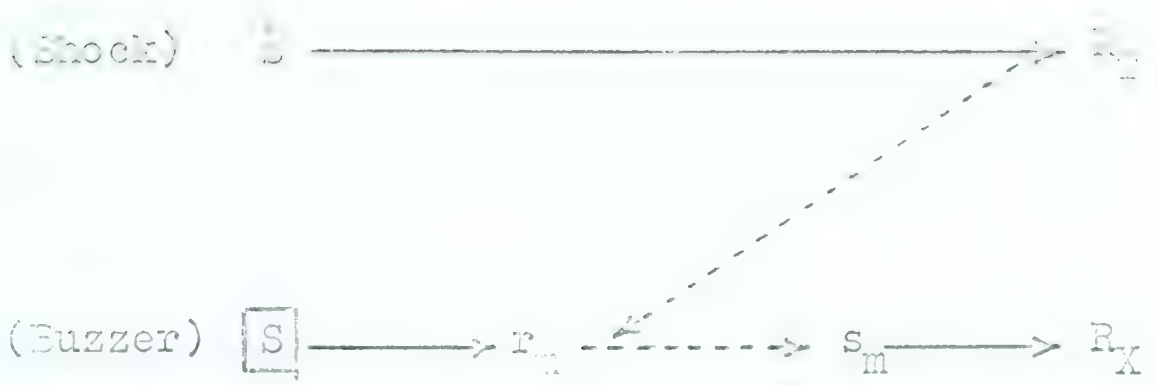

Figure 1. Symbolic Account of the Development of Sign Processes (Development of a Sign)[5]

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[5]Adapted from Osgood, op. cit., p. 7.

of instrumental acts (R_X) which 'take account of' the significate"[6] --a variety of response sequences intended to eliminate the signified shock.

Consequently we have linked sign and significate through partial identity of the "disposition" (r_m) with the behavior produced by the significate.

According to this view, words represent things in much the same way, because they produce in human organisms some replica of the actual behavior toward these things, as a mediation process. "This is the crucial identification, the mechanism that ties particular signs to particular significates rather than others.

"Stating the proposition formally: A pattern of stimulation which is not the significate is a sign of that significate if it evokes in the organism a mediating process, this process (a) being some fractional part of the total behavior elicited by the significate and (b) producing responses which would not occur without the previous contiguity of non-significate and significate patterns of stimulation."[7]

This conception of the learning of sign-processes, in effect, divides the usual S→R paradigm into two stages. One stage, decoding, is the association of signs with representational mediators (i.e. "interpretation"); the other stage, encoding, is the association of mediated self-stimulation with overt instrumental sequences (i.e. "expression of ideas"). Each stage is itself an S→R process. Hence the sign is related to significate through the common properties of r_m and R_T (semantic meaning) and also signs are related to overt behavior through the mediation function (pragmatic meaning).

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[6] Ibid. [7] Ibid., p. 7

The real significance of the foregoing explanation lies in the fact that "the vast majority of signs used in ordinary communication are...assigns-- their meanings are literally 'assigned' to them via association with other signs rather than via direct association with the objects signified."[8] This means that the meanings which different individuals will have for the same signs will vary to the extent that their behaviors toward the things signified have varied. That is, the composition of the representational process (which is the meaning of the sign) is dependent on the nature of the total behavior occurring while the sign is being established. As diagrammed in Figure 2, the stimulus pattern /s/ acquires portions of the mediating reactions already associated with the primary signs $\boxed{S_n}$.

Therefore, the meanings of many signs will reflect the idiosyncrasies of individual experience; and such variation in meaning should be particularly characteristic of assigns since their representational processes depend entirely upon the samples of other signs with which they occur. Nevertheless, if we accept as given, the essential sameness of human organisms and the stability of physical laws then the meanings of most primary perceptual signs should be quite constant across individuals. Furthermore, given stability of learning experiences within a particular culture the meanings of most common verbal signs will be highly similar.

It is because language signs have certain meanings in the psychological sense (i.e., are associated with certain representational processes) that they are used consistently in certain situations and

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[8] Ibid., p. 8.

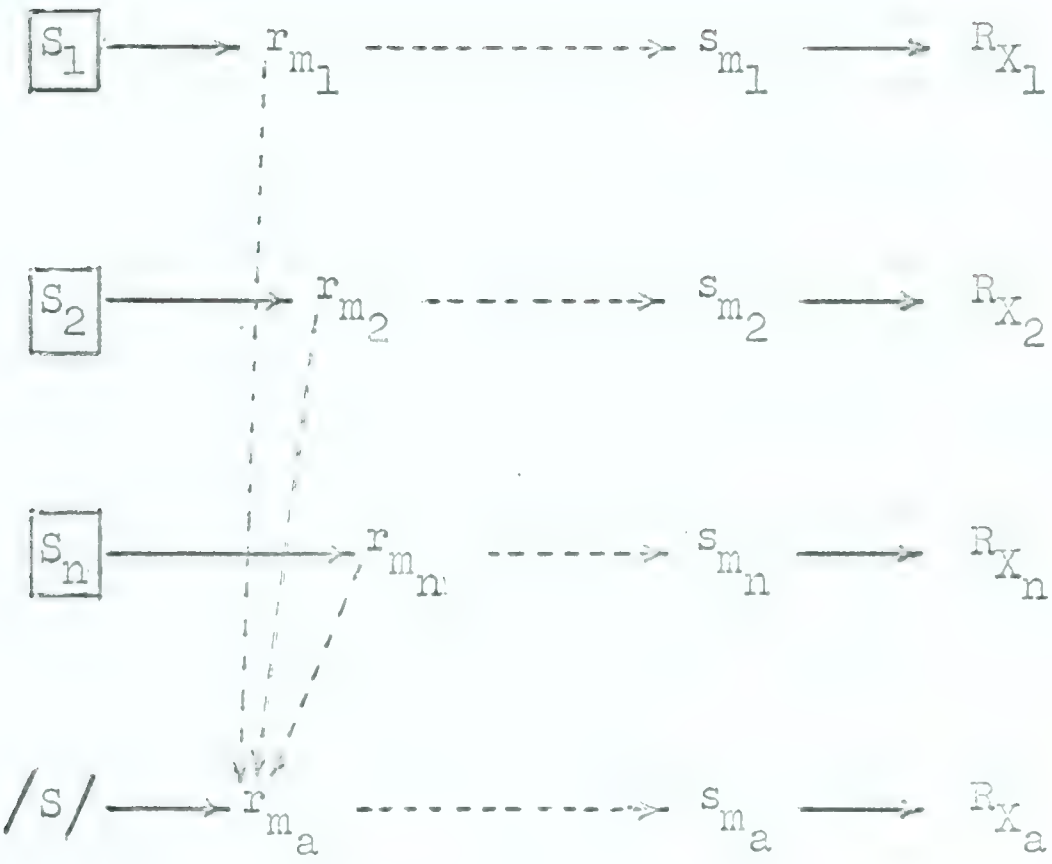

Figure 2. Symbolic Account of the Development of Sign Processes (Development of an Assign)[9]

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[9]Adapted from Osgood, op. cit., p. 7.

consistently produce certain behavior, and this is also the reason, in part at least, that they occur in predictable association with other signs in messages (linguistic meaning). Thus it is the very consistencies among situations and behaviors in human experience that determines the nature of representational processes and hence psychological meaning.

In summary, the meaning of "meaning" for which it is desired to establish an index is a psychological one--that process or state in the behavior of a sign-using organism which is assumed to be a necessary consequence of the reception of sign-stimuli and a necessary antecedent for the production of sign-responses. Within the general framework of learning theory, we have identified this cognitive state, meaning, with a representational mediation process and have tried to specify the objective stimulus and response conditions under which such a process develops.

Furthermore we can establish an index of these processes by the use of a special psychological tool. This tool is the semantic differential, a particular kind of measurement operation, which relates to the functioning of representational processes in language behavior and hence may serve as an index of these processes.

II. THE PROBLEM OF MEASUREMENT

Because meaning is one of the most important determinants of human behavior, it is obviously important to find an objective index or measure of it. However, meaning is also one of the most elusive of psychical phenomena. To measure it at all it is necessary to use

some observable expression or output as an index. That is, "we wish to find a kind of measureable activity or behavior of sign-using organisms which is maximally dependent upon and sensitive to meaningful states, and minimally dependent upon other variables."[10]

The search for such indices of meaning has followed a variety of directions and has led to the development of a variety of methods utilizing physiological, learning, "perceptual", and association data. Most of these prove inadequate when evaluated against the usual criteria for measuring instruments, viz., objectivity, reliability, validity, sensitivity, comparability, and utility.

In many of the studies, rating scales have been popular. Some psychologists have scaled traits, "attitudes", and abilities; others have scaled the association values of nonsense materials and also of meaningful materials. But surprisingly little effort has been made to measure meaning by the use of rating scales. In fact there had been no significant attempt to scale meaningful responses until Mosier's study in 1941.[11]

In that study, subjects rated a number of adjectives on an 11-point scale in terms of their favorableness or unfavorableness. From the responses Mosier was able to demonstrate a reasonable ordering of evaluative words in terms of their mean locations (e.g., excellent, good, common, fair, poor, etc.). The limitation in his technique, of course, is that he tapped only one dimension of meaning,

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[10] Ibid., pp. 10-11.

[11] C. I. Mosier, (1941) A psychometric study of meaning, J. soc. Psychol., 13, 123-140.

the admittedly important evaluative dimension. On the other hand, we may assume at the outset that meanings vary multidimensionally. However, the technique had been adopted, developed and proven. The next step, taken by others, was the development of a measuring instrument designed to provide a multidimensional analysis of meaning.

III. THE SEMANTIC DIFFERENTIAL

Glancing back at the theoretical paradigm in Figures 1 and 2, we shall call the "selective evocation of overt instrumental acts" (R_X) encoding. Presumably this encoding takes place by the representational mediation process($r_m \rightarrow s_m$) on the basis of differential reinforcement. "These R_X's are responses to the sign, which are assumed to depend upon the prior association of sign and significate and which are therefore, presumably appropriate to the meaning of the sign."[12]

There are many types of overt responses which may constitute R_X and hence serve as an index of r_m. Some of them are linguistic, some are not. Many intentionally encoded responses are non-linguistic and we often infer the meaning of a sign from a facial expression, gesture, or gross bodily movement which the sign occasions in an individual. However, such behavior is difficult to quantify, cumbersome to record, does not yield comparable units, and is probably insensitive to subtler meanings in most individuals. Therefore our attention will centre on linguistic responses.

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[12]Osgood, Op. Cit., p. 18.

Language as an Index of Meaning: The basic function of language (or linguistic encoding) is supposed to be the expression of ideas--the communication of meaning. Ordinarily, if we want to find out what something means to a person, we ask him to tell us directly or else we may ask for the associations which a person makes with the thing. There is some overlap in the two types of responses because a common mediation process (elicited by the stimulus sign) is operating in both cases.

> "Unrestricted linguistic output of this sort has a high presumptive validity...(and there is no more reason to question it here)...than in other psychological test situations... At least we can say that it has as much validity as any other technique based upon requested introspection...
>
> (Furthermore, when used with)..."highly intelligent and verbally fluent subjects, this method would be sufficiently sensitive, since it is likely that a language will tend to include those discriminations which its users find necessary to communicate. Less fluent subjects, however, find it very difficult to encode meanings spontaneously."[13]

Consequently, even though spontaneous linguistic output may be valid and sensitive, such casual introspections are hardly comparable and they do not lend themselves to quantification. The question then is, how can one compare the outputs of two different subjects discussing their meanings of the same term, and indicate the degree of similarity or difference in the meaning expressed? The answer is, by the use of the semantic differential.

The semantic differential is essentially a combination of controlled association and scaling procedures. The subject is provided with a concept to be differentiated and a set of bipolar

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[13] Ibid., p. 19.

adjectival scales against which to do it, his only task being to indicate, for each item (pairing of a concept with a scale), the direction of his association and its intensity on a seven-step scale. Thereafter, just as in the game of Twenty Questions* the selection of successive alternatives gradually eliminates uncertainty as to the object being thought about, so selection among successive pairs of common verbal opposites should gradually isolate the "meaning" of the stimulus sign.

Osgood cites studies which demonstrate that, given a form of the semantic differential, even less fluent individuals are able to quickly and confidently indicate a large number of judgements.[14] However, the instrument must be carefully developed.

> "The crux of the method...lies in selecting the sample of descriptive polar terms. Ideally, the sample should be as representative as possible of all the ways in which meaningful judgements can vary, and yet be small enough in size to be efficient in practice. In other words, from the myriad linguistic and non-linguistic behaviors mediated by symbolic processes, we select a small but carefully devised sample...which...is chiefly indicative of the ways that meanings vary, and largely insensitive to other sources of variation."[15]

SUMMARY: To use "linguistic encoding" as an index of meaning a semantic differential must satisfy the following requirements. It must have "(a) a carefully devised sample of alternative verbal responses which can be standardized across subjects, (b) these alternatives to be elicited from subjects rather than emitted so that encoding fluency is eliminated as a variable, and (c) these alternatives to be representative of the major ways in which meanings vary."[16]

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[14] Ibid., p. 19. [15] Ibid., p. 20. [16] Ibid., p. 19.

*A popular game played in which one member attempts to define a concept by asking questions for which a "yes" or "no" response is given in such a way that the universe of alternatives is reduced by half.

To increase the sensitivity of the measuring instrument a scale is inserted between each pair of terms, so that the subject is able to indicate not only the direction but also the intensity of each judgement.

IV. THE LOGIC OF SEMANTIC DIFFERENTIATION

The following statement will attempt to show the relation between the theoretical conception of meaning as a representational mediation process and the operations of measurement which constitute the semantic differential technique.

> "We begin by postulating a semantic space, a region of some unknown dimensionality and Euclidean in character. Each semantic scale, defined by a pair of polar...adjectives, is assumed to represent a straight line function that passes through the origin of this space, and a sample of such scales then represents a multi-dimensional space. The larger or more representative the sample, the better defined is the space as a whole."[17]

However, many of the "directions" established by particular scales are essentially the same and their replication adds little to the definition of the space. Therefore, to define the semantic space with maximum efficiency, we would need to determine that minimum number of orthogonal dimensions or axes which represents to some desired degree of accuracy the dimensionality of the space. In practice, we are satisfied with as many such independent dimensions as we can identify and measure reliably.

When a sample of scales, which is believed to be representative of the dimensions of meaning has been selected, the differentiation of a concept is accomplished in the following manner. A subject

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[17] Ibid., p. 25.

judges the concept against a series of scales such as the following:

good ___:___:___:___:___:___:___ bad

fast ___:___:___:___:___:___:___ slow

strong ___:___:___:___:___:___:___ weak

Each judgement represents a selection among a set of given alternatives and serves to localize the concept as a point in the semantic space. The validity of this point as representing the operational meaning of the concept will depend on the number of scales and the representativeness of their selection. Also, conversely, given the location of that point in the semantic space one can reproduce the original judgements insofar as each point has an orthogonal projection onto any line that passes through the origin of the space--i.e., onto any scale.

"By semantic differentiation, then, we mean the successive allocation of a concept to a point in the multidimensional semantic space by selection from among a set of given scaled semantic alternatives." Therefore, any differences in the meanings of two or more concepts is merely a function of the differences in their respective allocations within the same space.

Thus, the meaning of a sign in a particular context, has been defined as the representational mediation process which it elicits for a particular person. It has also been defined as the point in a semantic space which is specified by a series of differentiating judgements.

The point in space has two essential properties--<u>direction</u> from the origin, and <u>distance</u> from the origin--which may be identified

with the quality and intensity of meaning, respectively. The direction from the origin will depend on the alternative polar terms selected, whereas the distance depends on the extremeness of the scale positions checked.

Assuming there is some "finite number of representational mediation reactions available to the organism and...that the number of these alternative reactions...corresponds to the number of dimensions or factors in the semantic space...(the)...direction of a point in the semantic space will then correspond to what reactions are elicited by the sign, and the distance from the origin will correspond to the intensity of the reaction."[18]

Figure 3 represents an attempt to coordinate these two models graphically. The sign is represented as a point in an n-dimensional space (here 3 dimensions), with projections onto each of the dimensions of that space. The direction and magnitude of a line from the origin to a point on each dimension is estimated from the direction and extremeness of the subjects judgements against those scales of the semantic differential representing a particular dimension. The distance is assumed to be proportional to the intensity with which the sign elicits the mediating reaction corresponding to this dimension.

Part B of Figure 3 represents the meaning of the sign as a "simultaneous hierarchy of representational reactions."

> "It should be noted that whereas the reciprocal reactions within each dimension are assumed to be incompatible, those corresponding to independent dimensions are assumed to be compatible

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[18] Ibid., p. 26.

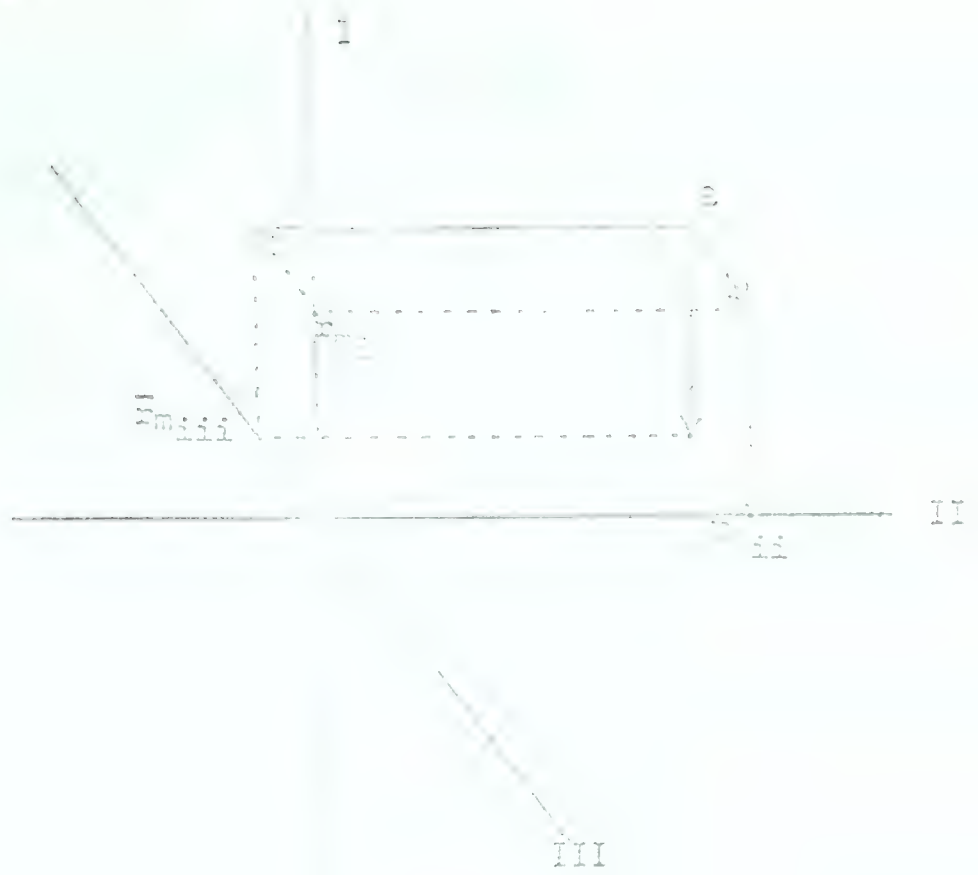

Figure 3. Assumed Relation between Mediation and Semantic Space Models.[19]

[19]Adapted from Osgood, on. cit., p. 19.

> and hence capable of simultaneous excitation. What we have done ...is to divide the total representational mediation process into a set of bipolar components, the meaning of a sign corresponding to the pattern and intensity with which these components are elicited."[20]

The actual behavior of subjects taking the semantic differential is as follows. Each item presents the situation:

(CONCEPT)

Polar Term X ___:___:___:___:___:___:___ Polar Term Y
1 2 3 4 5 6 7

in which the scale positions have been defined, for the subject, in the instructions as:

(1) extremely X
(2) quite X
(3) slightly X
(4) neither X nor Y; equally X and Y.
(5) slightly Y
(6) quite Y
(7) extremely Y

We assume that the terms "extremely," "quite," and "slightly" as linguistic quantifiers are associated with more or less equal degrees of intensity of whatever representational process (X or Y) happens to be elicited. Therefore, the sign combinations "extremely X," "quite X," and so forth will elicit an r_m of the quality X and of the intensity given by the quantifier.

> "Any concept being judged is a sign eliciting a distinctive set of component r_m's and r_m's with differing intensities. Similarly, the polar terms defining the scales are signs eliciting their own characteristic patterns of r_m's and $\bar{r}_m$'s, and when combined with quantifiers associated with scale positions, each scale position elicits an r_m pattern whose selection depends on the polar term and whose intensity depends on the quantifier."[21]

Thus what is operationally quite simple is behaviorally quite complex. The location of a concept in the semantic space defined by a set of factors is equated with the evocation by the

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[20] Ibid., p. 28. [21] Ibid., p. 29.

concept of a set of component mediating reactions. The direction in space is equated to what mediators are evoked and the distance from the origin is equated to how intensely these are evoked. Therefore each position on a semantic scale is associated with a complex mediating reaction, of which the dominant component depends on the polar term and the intensity depends on the quantifier.

> "These different mediators are associated, in encoding, with checking the various scale positions... The concept will elicit checking of that scale position whose dominant mediator component most closely matches in intensity the corresponding component in the...(mediation)...process associated with the concept itself... We assume that the coordinates in the measurement space are functionally equivalent with the components of the representational mediation process associated with this concept."[22]

This is one rationale by which the semantic differential can be considered an index of meaning.

V. THE DIMENSIONALITY OF THE SEMANTIC SPACE

The meaning of a sign has been defined as a representational process, a complex reaction divisable into some unknown but finite number of components.

For the purposes of measurement operations this complex mediation reaction has been identified with a point in a multidimensional space.

> "The projections of this point onto the various dimensions of the semantic space are assumed to correspond to what component mediating reactions are associated with the sign and with what degree of intensity. The essential operation of measurement is... (therefore)...the successive allocation of a concept to a series of descriptive scales defined by polar adjectives; these scales selected so as to be representative of the major dimensions along which meaningful processes vary."[23]

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[22] Ibid., p. 30.

[23] Ibid., p. 31.

The first step in selecting appropriate scales is the determination of the major dimensions of the semantic space, and the logical tool for such a multidimensional exploratory task is factor analysis.

Osgood describes a number of factor analytic studies designed to "isolate and identify the major factors operating in meaningful judgements." The results reveal a persistent reappearance of a particular factor structure each time.

The generality of this factor structure was tested in several studies[24] by varying a) the subject populations, b) the concepts judged, c) the type of judgemental situation used in collecting data, and d) the factoring method for treating the data.

The same primary factors reappeared despite the variations in method and the conclusion is drawn that the "factor structure operating in meaningful judgements is not dependent on these variables, at least."

In a typical study, using university students as subjects, Osgood was able to extract three major factors which he showed accounted for about 48% of total variance.[25] The first factor accounted for 33.8% of the total variance and was clearly identified as evaluative in nature. The scales which loaded very heavily on it were good-bad, clean-dirty, valuable-worthless, kind-cruel, happy-sad, fair-unfair, and similar others. The second factor (accounting for 7.6% of total variance) was identified fairly well as a potency variable. It was represented by such scales as large-small, strong-

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[24] Ibid., Chap. 2.

[25] Ibid., pp. 33-39.

weak, heavy-light, and similar others. The third factor (accounting for 6.2% of total variance) appeared to be mainly an activity variable. The most distinctive scales were fast-slow, active-passive, hot-cold, sharp-dull, and similar other ones.

The results indicate that the evaluative factor plays a dominant role in meaningful judgements. They also show that even with college students of considerable sophistication and intelligence, almost half of the total variance may be explained in terms of three factors--evaluation (34%), potency (8%), and activity (6%).

Although half of the total variance was unaccounted for, it appears that the rich and complex domain of meaning may be explainable to some extent in terms of a relatively simple structure of as few as three dimensions.

The same factorial structure reappearing in numerous studies leads one to believe with some assurance that the first determinant operating in meaningful judgements is clearly evaluative in nature and that it accounts for more than half of the extractable variance. The accompanying second and third factors appear to represent what may be called potency and activity determinants in meaningful judgements.

Even though the tendency for both activity and potency to be associated with evaluation may indicate a cultural semantic bias, we can say with some assurance that these may be considered to be operating as independent factors.

The overall correspondence among studies increases the confidence that what is being dealt with is something "consistent in the structuring of human thinking."

VI. THE SEMANTIC SPACE

The semantic space is a multidimensional space, with its dimensions corresponding to those factors which contribute to meaningful judgements. These factors are neither equally important nor equally used by subjects in differentiating the things judged, but they do appear to exhibit a certain consistency in structure and relationship.

In the studies reported by Osgood, the same three factors have emerged in roughly the same order of magnitude. This tends to indicate a certain stability of the evaluative, potency, and activity dimensions. A pervasive evaluative factor (attitudinal) regularly appears first and accounts for approximately one-half to three-quarters of the extractable variance. The second dimension to appear is usually the potency factor and typically accounts for about half as much variance as the first. The third is usually the activity factor and it is usually about equal to or smaller in magnitude than the second. Any additional factors which may be extractable, typically account for no more than half the variance attributable to the second or third factors.

The relative importance of these factors would seem to indicate the rank order of importance of the dimensions which a person brings to bear on the concepts judged.

Considering the variety of scales, concepts, and subjects used, the regularity with which this factorial picture repeats itself is impressive.

It is clear however that the three dominant factors do not exhaust the dimensions of the semantic space. In fact Osgood has identified several other factors as "stability," "tautness," "novelty," and "receptivity."[26] These are less clearly defined and each appears to be minor; but their appearance, along with the proportion of total variance remaining unaccounted for, indicates that the semantic space for concepts in general has a large number of dimensions.

However, the existence of a large number of dimensions in the total semantic space is not disastrous as far as measurement is concerned because each of these added dimensions in themselves account for relatively little of the total variance.

VII. THE CONTENT AND ADMINISTRATION OF A SEMANTIC DIFFERENTIAL

Factor analysis of meaningful judgements is a necessary step in the development of efficient instruments for measuring and exploring the dimensionality of meaning in human behavior. It is a means to an end rather than an end in itself.

Construction and Administration of a Semantic Differential: The semantic differential is not a specific "test" yielding a specific score but is rather a highly generalizable technique of measurement which must be adapted to the requirements of each problem to which it is applied. There are no standard concepts or scales, but these will depend on the purposes of the research. Standardization, and hence

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[26] Ibid., p. 74.

comparability, lies in the successive allocation of a concept to a semantic space defined by an unchanged set of general factors.

Content of a Semantic Differential: The term "concept" is used to refer to the "stimulus" for which the subjects checking operation is a terminal "response". Concepts may be as varied in nature as the modes of the signs. They may be verbal (e.g. nouns, adjectives, verbs, single words, phrases, etc.) or they may be non-verbal (e.g., TAT pictures, inkblots, aesthetic stimuli, sensory stimuli, etc.) The nature of the problem usually defines the class and form of the concept used.

The purpose of factorial work in the construction of a semantic differential is to reduce the great variety of potentially usable scales of judgement to some limited but representative number. In practice, a small sample of closely related scales is used to represent each factor. The responses to such a sample are assumed to be more representative and valid than results on individual scales.

The criteria for scale selection are as follows:[27]

1) The factorial composition of each scale. (At least three scales are usually selected to represent each factor. These are chosen to be maximally loaded on a particular factor and minimally on the others.)

2) The relevance of scales to concepts being judged. (Irrelevant scales yield neutral judgements, reduce the amount of information gained with a given set of scales, and do not permit defining of semantic dimensions.)

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[27] Ibid., p. 78.

3) The semantic stability of scales for the concepts and subjects used.

4) Scale linearity: scales should be linear between polar opposites and should pass through the origin of the semantic space.

5) Finally, scales of unknown dimensionality may be highly relevant to a particular problem and should be used and their factorial composition determined from the data of the experiment. The three dominant factors do not exhaust the semantic space therefore other high significant dimensions might be lost if the scales are restricted only to those three dimensions.

The number of scales selected is usually equal for each of the assumed number of dimensions, disregarding the unequal weights in meaningful judgements of each dimension. This is done to provide the subject with a balanced space which he may use as he sees fit. He may then make what discriminative use is necessary of each scale but his definition of the factors is not forced by the numbers of scales in the sample.

Administration of a Semantic Differential: The amount of material in the semantic differential will be limited by the amount of time that can be demanded of subjects, by costs of administration, and similar considerations. Nevertheless, at an average of 10-20 items per minute per subject (an "item" is a pairing of a concept with a scale), a large amount of information is gathered per unit of time as compared to other tests. Furthermore, rather than a single measure being obtained, several scores, on scales related to various dimensions, are derived for each concept judged.

Two graphic forms of the semantic differential are available. They differ chiefly in the way that concepts are presented with the scales. Both are equally applicable to most experimental situations, and no significant differences appear in the results obtained by either form. Nevertheless, Form II is more frequently used because it is more satisfying to the subject and more convenient for the investigator.[28]

Form II is also used in the present study. It takes the following format:

LADY

rough ___:___:___:___:___:___:___ smooth

fair ___:___:___:___:___:___:___ unfair

active ___:___:___:___:___:___:___ passive

The use of seven alternatives, or the seven-step scale, was prompted after repeated experiments indicated that when seven positions were available all tended to be used with roughly equal frequency.

Instructions to the subject include (1) orientation to the general nature of the task, (2) the significance of the scale positions and how to mark them, and (3) the attitude to be taken toward the task.

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[28]Form I presents items as follows:

LADY rough ___:___:___:___:___:___:___ smooth
ME fair ___:___:___:___:___:___:___ unfair.
Each concept appears on the same line as the scale against which it is judged, and concepts and scales are rotated against each other so that a maximum number of different concepts and scales occurs between repetitions of each concept and scale.

VIII. ANALYSIS OF SEMANTIC DIFFERENTIAL DATA

The raw data obtained with the semantic differential are a collection of checkmarks against bipolar scales. Each scale position is assigned an arbitrary digit score--usually ranging in value from 1 to 7. These digit scores collected from all the judgements made by the subjects will generate data which can be represented by a rectangular solid as illustrated in Figure 4, and which forms the basic data from which all operations and analysis follows.

Descriptive Measures: The meaning of a concept is defined operationally as the set of factor scores* obtained in judgements of that concept. For the individual, these measures are obtained directly; for a group or culture they are the average of the individual scores. Group scores are associated with some measure of dispersion or variability (e.g., the standard deviation) which presumably indicates the consistency of the meaning of the concept in the group.

In terms of a spatial model, the meaning of a concept may be defined as that point in a semantic space identified by its coordinates on several factors. Each coordinate gives the distance of a concept from the origin, in one or another direction, along an axis representing one of the factors; and each axis is placed in an orthogonal relation to every other one, and all intersect at the origin.

In the case of an individual the meaning of a concept is a point in the semantic space; in the case of a group the meaning is the central tendency of a "cloud" of such individual points. Similarities or differences in the meaning of concepts will be related to the

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*Scores derived from the ratings of the concept SCHOOL on the scales representing a factor.

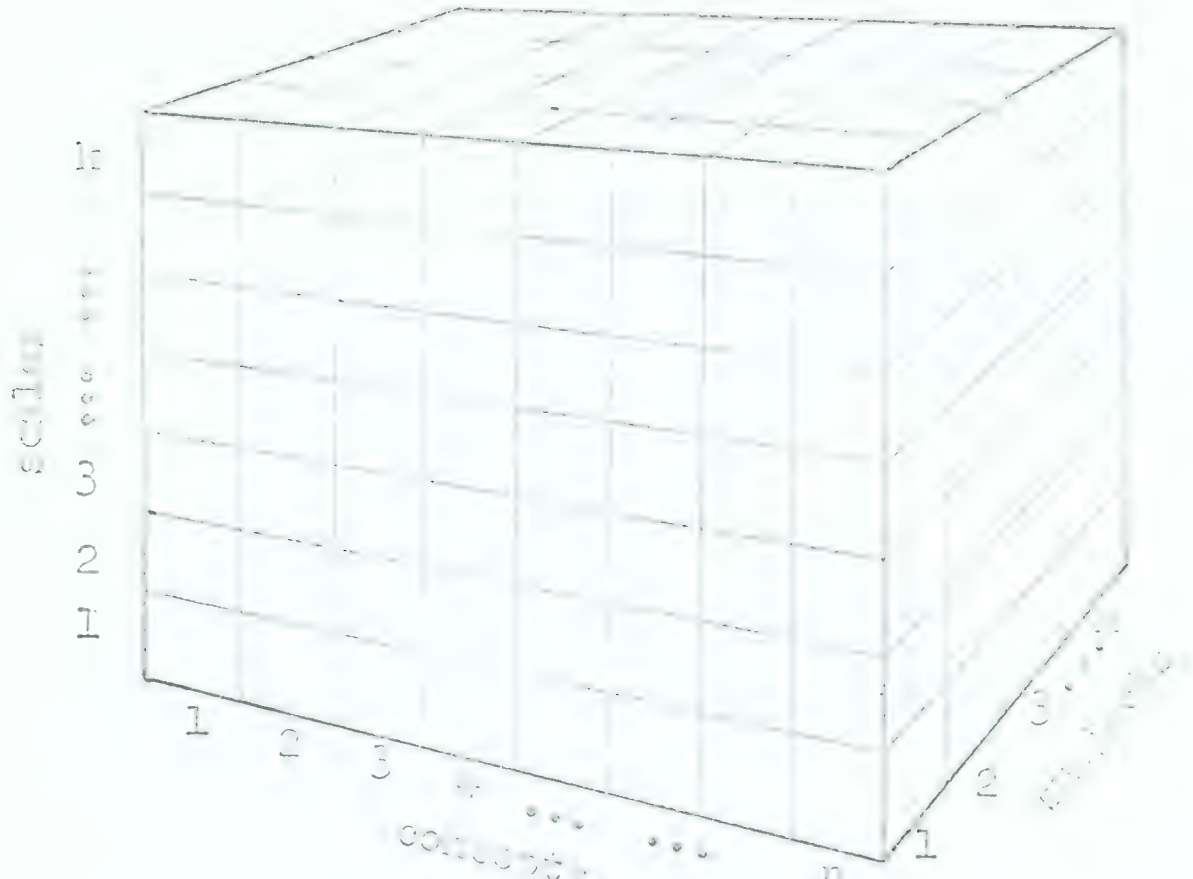

Figure 4. Rectangular Solid Representing Data Generated by the Semantic Differential.[29]

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[29]Adapted from [illegible], op. cit., [illegible].

distances between concept-points (or "clouds" of points) in the semantic space.

Significance Estimates: The investigator usually wishes to know how much confidence he can place in his findings.

In the case of group data there is replication over different individuals and many of the usual statistical tests can be applied directly. In the case of two different groups the significance of the difference in meaning of a concept may be calculated by the Chi-Square test.

IX. THEORETICAL ANALYSIS OF THE ATTRIBUTES OF A FRAME OF REFERENCE

It is not unlikely that a concept may be rated in such a way in a particular study as to be represented by scale points distributed along a single major dimension. In such a case there would probably be more than one factor operating, but one dominant dimension accounts for most of the variance. If this dominant dimension does not coincide with any of the factors derived from factorization of responses to concepts in general then we are led to consider the possibility of the formation of "characteristic attributes" that function within certain frames of reference.

The general model used in our semantic measurement work adopts as dimensions factors defined by those scales on which the concept is rated. However, another set of scales might have more discriminatory capacity in a specific measurement situation. The

resulting dimensions would obviously differ in semantic composition. Therefore dimensions other than the original factors should be used in certain cases.

The rationale for their use, in terms of our model, is based on the following assumptions:

> "(1) Semantic judgements can be completely represented in a semantic space defined by a set of elemental factors....
> (2) Any axis or dimension placed through the origin of the semantic space represents a potential semantic scale or attribute of judgement...(although it may not have discreet or unitary verbal labels)....
> (3) The semantic nature of any such attribute is given by its relations with the elementary factors....
> (4) Every concept in the semantic space may be said to be 'contained' by its characteristic attribute...(and)...
> (5) Two concepts may interact to the extent that they are contained by the same attributes... (Thus)...when two concepts share the same characteristic attribute, they may be directly compared; if their characteristic attributes are orthogonal to each other, they are simply not comparable."[30]

With actual data the likely situation is that the coordinates of scales related to concepts tend to scatter in "clouds" about what may be defined as a dominant characteristic attribute--that line through the origin which is as close as possible in the least squares sense to all the concept-points in the scatter. The dominant characteristic attributes of a structure are analogous to the factors in a simple structure.

It is possible that through the characteristic attribute approach an apparently unidimensional factor may be resolved into multidimensional elements.

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[30] Ibid., pp. 116-117.

X. EVALUATION OF THE SEMANTIC DIFFERENTIAL

The standard criteria for evaluating measuring instruments are objectivity, reliability, validity, sensitivity, comparability, and utility.

Objectivity: The administrative procedures concerning the semantic differential "completely eliminate the idiosyncracies of the investigator in arriving at the final index of meaning".

Reliability: Item reliability (the reproducibility of basic item scores) has been tested in various ways. In one study the test-retest correlation obtained an r of .85.[31] In other studies[32] test-retest item scores were related on something other than a chance basis at better than the 1% level.

The actual error of measurement found has been only one-half as large in absolute value as might have been expected by chance. Evaluative scales yielded much smaller errors of measurement than other scales.

The reliability of concept meanings and the reliability of semantic distances both depend on the reliability of factor scores, and therefore no separate estimates of these need be given.

Validity: The semantic differential is supposed to measure meaning and there is no independent, commonly accepted, quantitative

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[31] Ibid., p. 127.

[32] L. N. Solomon, (1954) A Factorial Study of Complex Auditory Stimuli, Urbana, University of Illinois; and K. Wilson, (1954) Multidimensional Scaling of Data Obtained by Method of Triads, Urbana, Control Systems Lab., University of Illinois; cited in Osgood, op. cit., p. 128.

criterion of meaning. Therefore one must fall back on "face validity," specific external criteria, validity of semantic factors, validity of scaling assumptions, and validity as an index of the representational mediation process.

No reason has been found to question the face validity of the semantic differential.

Also, Osgood states that many instances have been found where external validity criteria of specific sorts have supported the behavioral validity of semantic measurement.

Rowan[33] has conducted a study on the validity of semantic factors and from the results of the study concluded that the representation of concepts by the semantic differential is a natural one. He concluded that people, in judging the meanings of concepts, actually use the scales, which are representative of the semantic dimensions.

The validity of certain scaling assumptions (assumption of equal scale intervals within a scale, of equal intervals between scales, and the assumption that the zero point, the scale origin, falls at the centroid of each scale) has been variously tested by several researchers.[34] The results indicate that there was a tendency for extreme categories to be large and centre ones small (the so-called "end effect"), but deviations from equal intervals were small and correlations of assumed and scaled boundary positions yielded exceedingly

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[33]T. C. Rowan, (1954) Some Developments in Multi-dimensional Scaling Applied to Semantic Relationships, unpublished doctor's dissertation, University of Illinois, cited in Osgood, op. cit., p. 143.

[34]Osgood cites the studies of Diederich, Messick and Tucker, of Gulliksen, and of Saffir, ibid., p. 146.

high values. What is more, an approximate equality of intervals between scales and a similar placement of origins across scales indicated that the scaling properties assumed with the semantic differential have some basis other than mere assumption.

The testing of the validity of the semantic differential as an index of representational mediation processes is admittedly a major gap in the work to date. However, Osgood states that a number of studies have been made and more were in progress.[35]

Some of these studies have been made with different behavioral correlates hypothesized to be related to mediational processes. For example, we know that meaning is an important intervening variable in human behavior. Therefore if the semantic differential can provide a reasonably faithful index of meanings then one should be able to predict overt behavior to signs from the measurements and/or relationships indicated by the semantic differential and factor analysis. A number of experiments have supported a behavioral validity of this kind.

Finally, it can be demonstrated that the reversibility of measurement operations, a direct test of validity, is successfully achieved when the number of concepts judged is small and highly varied in meaning.

Sensitivity: Tests of its sensitivity indicate that the distinctions made by the semantic differential show close correspondence to those made independently by language users.

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[35]Osgood cites especially the work at the University of Minnesota by Jenkins, Russell and others, ibid., p. 154.

Comparability: A number of studies of comparability across subjects have been made and the results have indicated that for individual subjects,[36] for groups of subjects,[37] across language and culture variations,[38] the same set of characteristic attributes held for all. Thus it appears that the semantic differential can be applied with an encouraging degree of comparability across subjects.

Comparability across concepts presents a different situation. The ideal semantic measuring instrument would have a small set of scales having the following properties: (a) high loading on the factors they represent, (b) high correlation with other scales representing the same factor, (c) low correlation with scales representing other factors (and hence low loading on other factors), and (d) a high degree of stability across the various concepts judged. However, the vast majority of semantic differential scales show significant variations in their correlations with other scales across concepts. Thus it is evident that meaning of the scales change somewhat with the concept being judged.

The studies of comparability across concepts[39] revealed,

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[36]C. E. Osgood and Zella Luria, (1954) A Blind Analysis of a Case of Multiple Personality Using the Semantic Differential, J. abnorm. soc. Psychol., 49, 579-91.

[37]Joan Bopp, (1955) A Quantitative Semantic Analysis of Word Association in Schizophrenia, unpublished doctor's dissertation, University of Illinois, cited in Osgood, op. cit., p. 170.

[38]H. Kumata and W. Schramm, (1956) A Pilot Study of Cross-Cultural Meaning, Publ. Opin. Quart., cited in Osgood, loc. cit.

[39]D. R. Shaw, (1955) Variation in Inter-Scale Correlation on the Semantic Differential as a Function of the Concept Judged, unpublished master's thesis, University of Illinois, cited in Osgood, op. cit., pp. 176-180.

first, that there is a high degree of concept-scale interaction (and particularly that the more evaluative a concept was the more the meanings of all scales shift toward evaluative connotation). In other words, it appears that "in the process of human judgement, all scales tend to shift in meaning toward parallelism with the dominant (characteristic) attribute of the concept being judged."

"Evaluation...appears to be a highly generalizable attribute which may align itself with almost any other dimension of meaning, depending on the concept being judged... (Yet, despite the)... instability of individual scales, there is considerable repeatability (and hence comparability) of the major factors across the concepts being judged."[40]

This instability of individual scales will have no relevance for or bearing on the present study of the SCHOOL because only one concept is involved.

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[40]Osgood, op. cit., p. 188.

CHAPTER III

ATTITUDE MEASUREMENT

Through the work in experimental semantics a new approach and rationale has been developed for attitude measurement. In fact it has been "feasible to identify 'attitude' as one of the major dimensions of meaning-in-general."[41]

I. A DEFINITION OF ATTITUDE

Despite a plethora of definitions some concensus and agreement is evident respecting the major properties of attitudes.

Attitudes are learned and implicit (inferred) states of the organism. They are "predispositions to respond"--inclining toward an evaluative response which distinguishes them from other such states of readiness. They are basically tendencies of approach or avoidance (implying favorableness). In addition, they may be "ascribed to some basic bipolar continum with a neutral or zero reference point, implying that they have both direction and intensity and providing a basis for the quantitative indexing of attitudes."[42]

Because an attitude is a learned implicit process, potentially bipolar, varying in intensity, and mediating evaluative behavior, it is considered to be part of the "internal mediational activity that

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[41] Osgood, op. cit., p. 189.

[42] Ibid., pp. 189-190.

operates between most stimulus and response patterns." Furthermore, if attitude is a part of internal mediational activity, it follows that it must be part of the semantic structure of an individual and may be indexed. The factor analysis provides a basis for extracting the attitudinal component.

Therefore, if evaluative behavior is mediated by attitude in the manner suggested above, it seems reasonable to identify attitude with the evaluative dimension of the total semantic space. Consequently where we defined the meaning of a concept as its allocation to a point in a multidimensional semantic space, we may now define attitude as the projection of this point onto the evaluative dimension of that space.

Also, since every point in a semantic space has an evaluative component, then "every concept must involve an attitudinal component as part of its total meaning." Therefore when we wish an index for an attitude, we must use a set of scales which have high loadings on the evaluative factor "across concepts generally and negligible loadings on other factors."

The major properties of attitudes which such measurement may be expected to index are direction of attitude (favorable or unfavorable) and intensity of attitude (polarization).

II. EVALUATION OF THE DIFFERENTIAL AS A MEASURE OF ATTITUDE

Test-retest reliability data have yielded coefficients ranging from .87 to .93 with a mean r of .91.[43]

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[43] P. H. Tannenbaum, (1953) Attitudes toward Source and Concept as Factors in Attitude Change through Communications, unpublished doctor's dissertation, University of Illinois, cited in Osgood, op. cit., p. 192.

The instrument displays reasonable face validity as a measure of attitude insofar as evaluative scale ratings were found to discriminate in the ways expected (borne out in the several studies reported by Osgood).[44] Furthermore, comparisons of ratings with independently devised measuring instruments (Thurstone Scales and the Guttman Scale) have yielded correlations significantly greater than zero with the alpha error set at 1%.

III. GENERALIZED ATTITUDE SCALES

The semantic differential may be used as a generalized attitude scale because its factor scales have been selected to define "pure", abstracted linguistic evaluators. It is desirable that these scales maintain high intercorrelations with themselves across concepts, and also the summation of scores derived from them jointly display "high and roughly equal correlations with various specific attitude measuring instruments used as criteria."

As a generalized attitude scale the semantic differential also has some very practical advantages. These include economies in time, money, and effort (different "master" scales are not necessary; exactly the same set of evaluative dimensions would be used for all objects of judgement); and the comparability which it offers (direct comparison among attitudes becomes more tenable.)

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[44]Osgood, op. cit., pp. 192-195.

IV. MEANING vs. ATTITUDE IN THE PREDICTION OF BEHAVIOR

Osgood states, that "Attitude scores indicate only a disposition toward certain classes of behaviors... Overt behavior can seldom be predicted from knowledge of attitude alone."[45] This is true because attitude is only one of the dimensions of meaning and hence provides only part of the information necessary for prediction. Thus two people may have identical or highly similar attitudes toward a concept but yet have quite different meanings of the concept. So while different attitudes imply different behaviors, the same attitudes do not automatically imply the same behavior.

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[45] Ibid., p. 198.

CHAPTER IV

THE EXPERIMENTAL DESIGN

This study involves administering the semantic differential to three groups of students; intercorrelating the values obtained on a number of scales; and computing eigenvalues and eigenvectors to determine the nature and the dimensionality of the semantic space.

I. THE INSTRUMENT OF MEASUREMENT

The semantic differential instrument consists of forty-five seven-step bipolar scales set in the format of Osgood's graphic Form II.* Most of the scales were selected from lists of those used by Osgood and other researchers, and some were included on the basis of a priori reasoning.

Selection was made in such a way as to give approximately equal representation to each of the assumed major factors (evaluation, potency, and activity) which Osgood and others found regularly reappearing in their studies.

A pilot study was conducted using an initial group of thirty-eight scales to see if they were relevant to measurement of the meaning of SCHOOL. The results indicated that all were relevant--i.e., on each scale, the subjects were able to designate values which appeared to be significantly different from zero. Subsequently seven

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*See Appendix I, page 102.

additional scales were selected because it was thought that these might lead to the definition of factors other than those given by Osgood. The forty-five scales finally selected and employed, and the factors they are believed to represent, are listed in Table I.

Each scale presents a seven-step progression from one polar term to its opposite. The use of seven alternatives was prompted by results of repeated experiments, by other researchers,[46] which indicated that with seven alternatives all of them tended to be used with roughly equal frequency.

Each alternative or step is assigned an arbitrary value, and the check marks made by the subjects are thereby scored according to which step in the scale is checked. The values are arranged in progression from one at extreme left to seven at extreme right.

The scales are presented in an order which randomizes the order of the factors presumably measured by each item. In addition, the direction of polarity in the scales has been alternated to prevent the formation of position references.

The design of the instrument is such that it is easily administered to a group of student subjects in ten minutes.

II. THE SAMPLE

The semantic differential was administered to 367 students consisting of the following groups: 87 Grade IX students at McKernan

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[46] R. Stagner and C. E. Osgood, (1946) Impact of War on a Nationalistic Frame of Reference: I. Changes in General Approval and Qualitative Patterning of Stereotypes, J. soc. Psychol., 24, 187-215, as cited in Osgood, op. cit., p. 85; and Joan Bopp, loc. cit.

TABLE I.

SEMANTIC SCALES AND THE FACTORS THEY ARE BELIEVED TO REPRESENT

Scale No.	Scale	Factor
1	like-dislike	Evaluative
2	large-small	Potency
3	dull-bright	Potency
4	wide choice-narrow choice	Activity
5	noisy-quiet	Activity
6	modern-old	Evaluative
7	unfair-fair	Evaluative
8	courteous-impolite	Evaluative
9	active-passive	Activity
10	pleasing-annoying	Evaluative
11	cramped-spacious	Activity
12	false-honest	Evaluative
13	flexible-rigid	Potency
14	awful-nice	Evaluative
15	empty-full	Potency
16	aggressive-unenterprising	Activity
17	incompetent-competent	Potency
18	cool-warm	Activity
19	important-trivial	Evaluative
20	attractive-repulsive	Evaluative
21	high-low	Evaluative
22	constructive-destructive	Potency
23	autocratic-democratic	Potency
24	dependable-undependable	Potency
25	peaceful-irritating	Evaluative
26	fast-slow	Activity
27	unethical-ethical	Evaluative
28	advancing-declining	Activity
29	hostile-friendly	Activity
30	shoddy-quality	Evaluative
31	helpful-useless	Potency
32	reputable-dishonest	Evaluative
33	competitive-indifferent	Potency
34	narrow-wide	Activity
35	irresponsible-responsible	Evaluative
36	wasteful-thrifty	Potency
37	bad-good	Evaluative
38	delicate-rugged	Potency
39	efficient-inefficient	Potency
40	radical-traditional	Evaluative
41	service-disservice	Potency
42	depressing-exciting	Activity
43	strong-weak	Potency
44	cheap-expensive	Potency
45	effective-ineffective	Evaluative

Junior High School, 153 Grade XI students at Strathcona Composite High School, and 127 First Year students in Educational Psychology at the University of Alberta in Edmonton.

The three groups were chosen in such a way that the average age of each is approximately two years different from the next closest group--i.e., First Year University students are approximately two years older than Grade XI students who are approximately two years older than Grade IX students.

The hypothesis is put forth that a progressive change or development occurs in the semantic structure of the concept school from Grade IX to First Year University. It was reasoned that analysis of the results would reveal specific quantitative and qualitative similarities and/or differences in the meanings expressed. It was anticipated that younger subjects would tend to define the concept school in simple, relatively extreme and dogmatic terms, but that older subjects would demonstrate more moderate though more complex semantic structuring of the concept.

III. THE PROCEDURE

The semantic differential was administered to each group of students by their classroom instructors in the following manner. Grade IX Social Studies instructors at McKernan School administered the form to their students in the regular Social Studies class periods. Similarly the instructor in Grade XI English at Strathcona School administered the differential to his English students in their regular

class periods. In both instances the ratings were completed in a single day. In like manner, University instructors in Educational Psychology administered the instrument to their students.

In order to make the exercise meaningful to school students the semantic differential was introduced in the following manner. Students were told, "The form you have been given is an example of a scientific research tool. It is an instrument designed to provide objective information in studies in the social sciences.

"You are asked to make ratings of 'school' on each of forty-five different scales. In making these ratings you are asked to think of schools-in-general rather than of any particular school--i.e., you may think of the overall school system."

The instructors emphasized the importance of using the scales correctly, then read the instructions, on Page 1 of the form, with the students. After this, students made their ratings.

In the case of the University group the instructors made similar but less formal introductory remarks about the instrument. These students were asked to read carefully the instructions on how to use the scales, and then to proceed with their ratings.

No time limits were set but all three groups completed their ratings easily in ten minutes.

Every response (indicated by check marks on the rating scales) was assigned a value, according to the method described above. These values or raw scores were then transferred to IBM punched cards for electronic machine processing. The cards were then processed at the University of Alberta's Data Processing Centre.

IV. NUMERICAL ANALYSIS

The responses made on the forty-five scales of the semantic differential were intercorrelated so that a symmetric matrix of order 45, composed of Pearson product moment correlation coefficients was available for each group of student subjects.

Factor analysis was obtained by computing eigenvalues and eigenvectors for each matrix. The size and number of latent roots with values equal to or greater than "one" was observed and thus the predominant and most significant factors of meaning were determined for each student group.

To obtain "simple structure" as defined by Thurstone the first five factors in each group was rotated according to the varimax criterion.[47] The rotated axes thus established constituted the basis of the factorial interpretations.

Since the number of significant dimensions was less than the number of scales, analysis was based upon those scales which measured predominantly a particular dimension.

Graphic plots were made of the most significant factors in each student group. These plots give some indication of the relationship of each semantic scale with a particular factor. They also present a graphic illustration of the adequacy of an orthogonally designed system of dimensions.

The results are described and compared, both quantitatively and qualitatively for each of the three groups.

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[47] Kaiser. The variance criterion for analytic rotation in factor analysis, Psychometrika, 1958, 3, 187-200.

CHAPTER V.

FINDINGS

I. EXTRACTION OF FACTORS

The results of the subjects' ratings of SCHOOL were observed for each student group. A preliminary review of the scores obtained on each semantic scale revealed that the means of the scores were not at the centre of the scales.

This would indicate that the semantic scales employed in the measuring instrument were relevant to the concept being judged. In other words, the student subjects demonstrated that they could make meaningful judgements of the SCHOOL by the use of each scale of the semantic differential.

The scores obtained from the semantic scales were inter-correlated for each student group, and the factor analysis was accomplished by computing eigenvalues and eigenvectors for each matrix of correlations. Initially each principal axis (or factor) which had an eigenvalue equal to or greater than "one" was considered significant and was extracted for study.

In the Grade IX group there were eleven such significant factors with latent roots ranging in value from 17.766 to 1.022 and accounting for 72% of the total measured variance in scale scores. In the Grade XI group there were twelve significant factors ranging in value from 13.025 to 1.070 and accounting for 67% of total variance. In the University group thirteen significant factors were obtained. These ranged in value from 11.185 to 1.059 and accounted for 70% of the total variance

in scale scores. These factors and the values of each are given in Table II for all three student groups.

Since the meaning of the concept SCHOOL is defined by the relationships expressed by the correlations between scales the variance accounted for by each dimension expresses the degree to which the dimension accounts for the observed variability of the scales. Therefore it is apparent that, for the student population as a whole, approximately a dozen factors account for a very large proportion of the total variance in meaning. About one-half of this variance is attributed to the first three factors in each group and each factor after the third accounts for progressively less variance. Consequently the present analysis is limited to the three largest factors in each student group.

Examination of the scale scores prior to analytical rotation revealed some unexpected results. The scales characterizing each dimension did not form the well defined Evaluative, Potency, or Activity groupings suggested by Osgood. Instead, each grouping exhibited such a mixture of scales that components of all of Osgood's major dimensions were identifiable in each of the factors extracted in this study.

In view of this, an attempt was made to clarify the factorial structure by analytical rotation of the first five principal axes.

II. THE VARIMAX ROTATION

The variance of the first five factors in each group after

Table II.

FACTORS WITH EIGENVALUES GREATER THAN UNITY

Factor	Grade IX	Grade XI	University
1	17.766	13.025	11.185
2	2.483	2.810	3.334
3	2.106	2.249	2.297
4	1.592	1.717	2.128
5	1.489	1.630	1.801
6	1.365	1.452	1.652
7	1.241	1.339	1.529
8	1.217	1.295	1.479
9	1.177	1.224	1.269
10	1.050	1.175	1.224
11	1.022	1.100	1.177
12		1.070	1.139
13			1.059
Percent of Total Variance	72%	67%	70%

rotation is presented in Table III.[48] The largest of these factors and the scale loadings obtained on each formed the basis of the analysis to follow.

Grade IX Group: The first five factors in this group account for 55.8% of the total variance. The first three of these account for 41.4% of total variance and the examination of factors was limited to these three.

Factor I with a sum of squares of 7.778 accounts for 17.3% of total variance in meaning. The scales characterizing this factor (with their signs shown in parenthesis) are LIKE (+), COURTEOUS (+), ACTIVE (+), PLEASING (+), EMPTY (-), INCOMPETENT (-), IMPORTANT (+), CONSTRUCTIVE (+), DEPENDABLE (+), UNETHICAL (-), ADVANCING (+), HELPFUL (+), REPUTABLE (+), IRRESPONSIBLE (-), BAD (-), EFFICIENT (+), RADICAL (-), SERVICE (+), STRONG (+), CHEAP (-), and EFFECTIVE (+). The scales were selected on the basis of scale score; all scales which had a loading value on Factor I which was greater than .400 were included in the selection. These scales and their rotated loadings are presented in Table IV. Table IV also gives the scale communalities which represent the amount of variance of the scales which can be accounted for by the selected factors. (The loadings of all 45 test scales and their communalities are given in Appendix II.)

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[48]The rotations were made according to the method described by Kaiser in "The variance criterion for analytic rotation in factor analysis", Psychometrika, 1958, 3, 187-200.

Table III.

VARIANCE ACCOUNTED FOR BY EACH FACTOR AFTER ROTATION

	Sums of Squares of Loadings		
Factor	Grade IX	Grade XI	University
1	7.778	6.503	6.423
2	7.485	5.487	5.917
3	3.402	4.818	3.265
4	3.372	2.565	3.212
5	3.072	2.071	1.921
Percent of Total Variance	55.8%	47.7%	46.1%

Table IV.

LOADINGS OF SCALES DEFINING FACTOR I FOR GRADE IX

Scale	Varimax Factor Loading*			h_j^2
	Factor I	Factor II	Factor III	
Like (E) **	.420	-.564	.165	.522
Courteous (E)	.447	-.374	.428	.523
Active (A)	.430	-.377	-.143	.347
Pleasing (E)	.432	-.636	.176	.622
Empty (P)	-.676	.265	.035	.528
Incompetent (P)	-.483	.132	-.168	.279
Important (E)	.692	-.073	.198	.523
Constructive (P)	.653	-.136	.269	.517
Dependable (P)	.478	-.448	.320	.532
Unethical (E)	-.586	-.014	-.036	.345
Advancing (A)	.649	-.200	.034	.462
Helpful (P)	.705	-.260	.263	.634
Reputable (E)	.543	-.286	.062	.380
Irresponsible (E)	-.451	.335	.013	.316
Bad (E)	-.521	.376	-.288	.496
Efficient (P)	.646	-.252	.176	.512
Radical (E)	-.406	.176	-.219	.244
Service (P)	.553	-.429	-.128	.506
Strong (P)	.607	-.422	-.209	.590
Cheap (P)	-.475	.277	-.009	.302
Effective (E)	.598	-.362	.180	.521

* Signs reflected.

** Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

From the table it can be seen that these scales are not factorially "pure" in the sense that they are independent of significance for all other factors. But although they are "impure" they exhibit significantly high loadings on Factor I and therefore give it its distinctive characterization. To the extent that these scales characterize Factor I rather than any other factor they may be considered to be valid indic ators or measures of the quality of Factor I.

Reviewing the assumed factorial association of each scale (see Table I, page 44) it is apparent that Factor I, unlike Osgood's first factor, is defined by Evaluative, Potency, and Activity scales. Of these scales only a few are Activity indicators, a fairly large number are Potency indicators, but the majority are Evaluative scales. Consequently Factor I could not be described in terms of one of Osgood's three major dimensions. It appears to represent a different dimension of meaning.

An interpretation of Factor I on the basis of the dimensions that the scales were thought to define, would indicate that this factor is an Evaluative-Potency factor at least with reference to the concept SCHOOL. It appears however to be predominantly Evaluative in this context.

The Evaluative emphasis is indicated by the selection of scales exhibiting the highest loadings on the factor. These scales are IMPORTANT, CONSTRUCTIVE, UNETHICAL, ADVANCING, HELPFUL, REPUTABLE, BAD, EFFICIENT, SERVICE, STRONG, and EFFECTIVE. Thus Factor I appears to be an Evaluative-Potency factor. However, since Factors II

and III also exhibit predominantly evaluative characteristics the name of Factor I has been abbreviated to briefly Potency factor.

The graphic plots in Figures 5 and 6 illustrate the relationship of each scale to Factor I as compared to Factors II and III. Inspection of the graphs will reveal the degree of identity existing between scales and factor and the configuration of points about the rotated axes.

Factor II with a sum of squares of 7.485 accounts for 16.6% of total variance. The scales with highest loading values on this factor and their signs are LIKE (+), DULL (-), UNFAIR (-), PLEASING (+), CRAMPED (-), FALSE (-), AWFUL (-), ATTRACTIVE (+), DEPENDABLE (+), PEACEFUL (+), FAST (+), NARROW (-), and DEPRESSING (-). These scales with their rotated loadings and communalities are shown in Table V.

An examination of Table V will show that these scales like those of Factor I exhibit a variety of Evaluative, Potency, and Activity characteristics. Therefore as in the case of Factor I, it is not feasible to describe Factor II in terms of only one of Osgood's major dimensions.

Also as in the case of Factor I it is the Evaluative scales which are most highly related to Factor II, but the Potency scales have become minor in significance while the Activity scales become second in importance. In terms of Osgood's dimensions this factor appears to be related mainly to Evaluative and Activity dimensions.

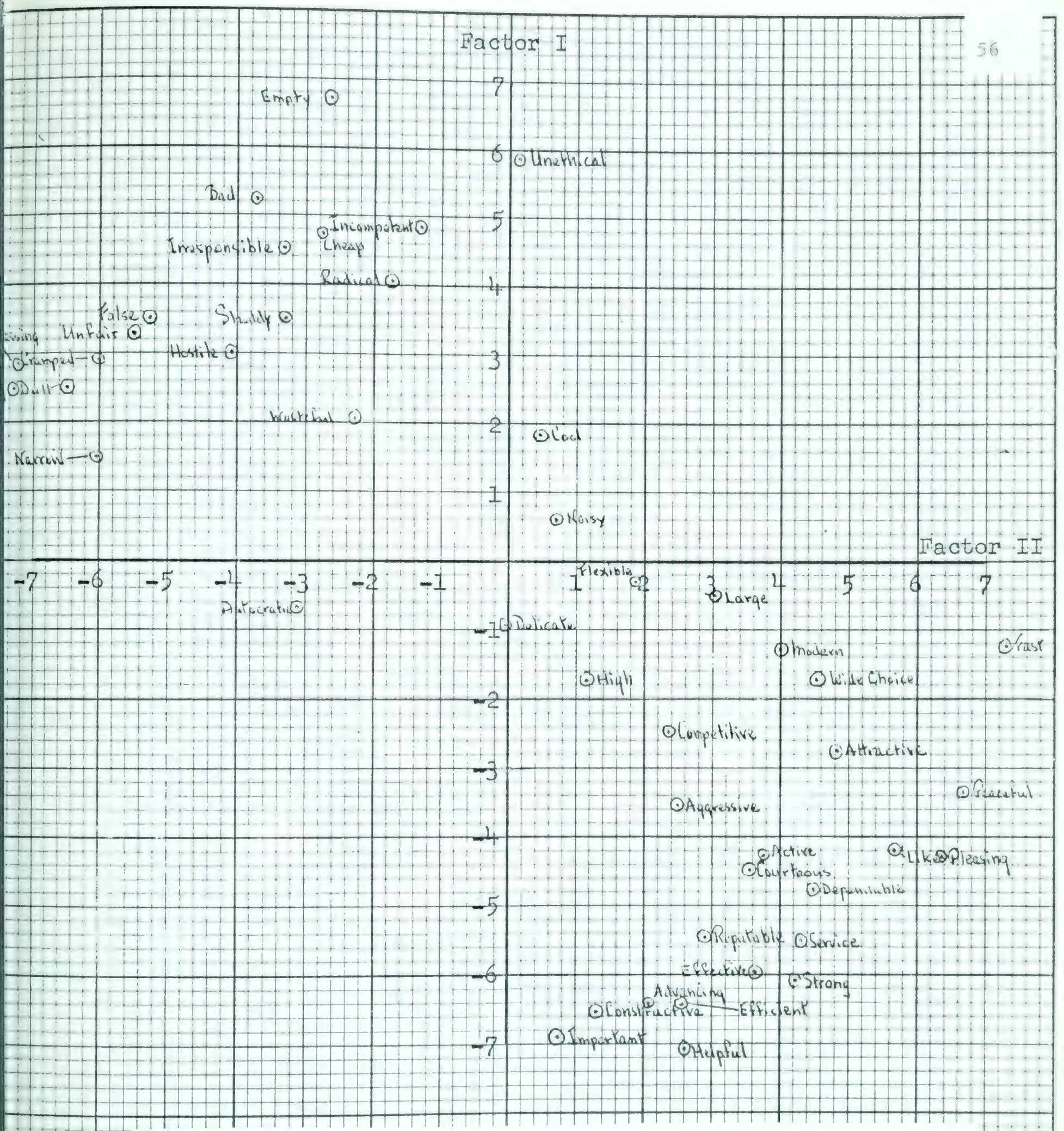

Figure 5. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors I and II in Grade IX.

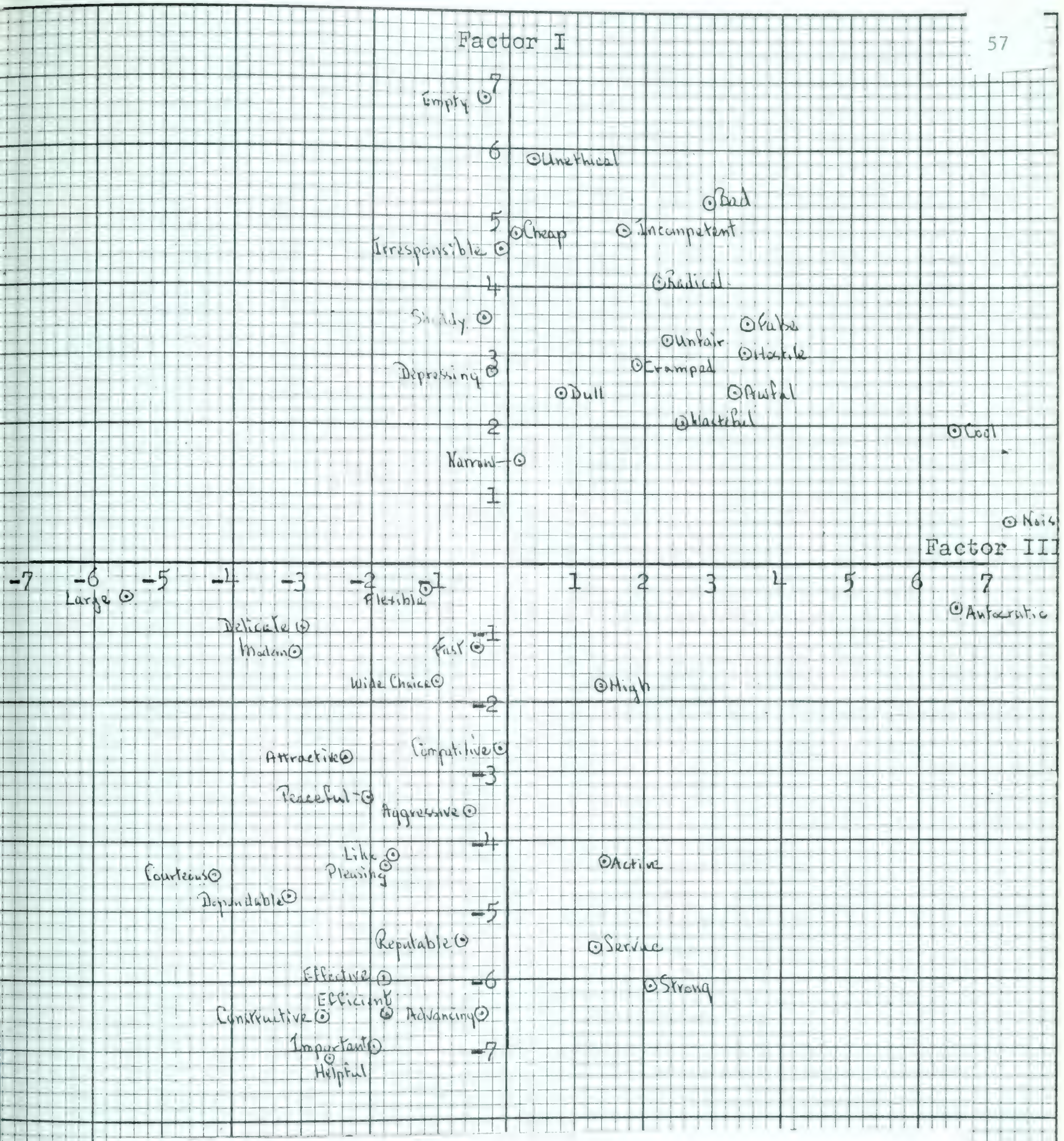

Figure 6. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors I and III in Grade IX.

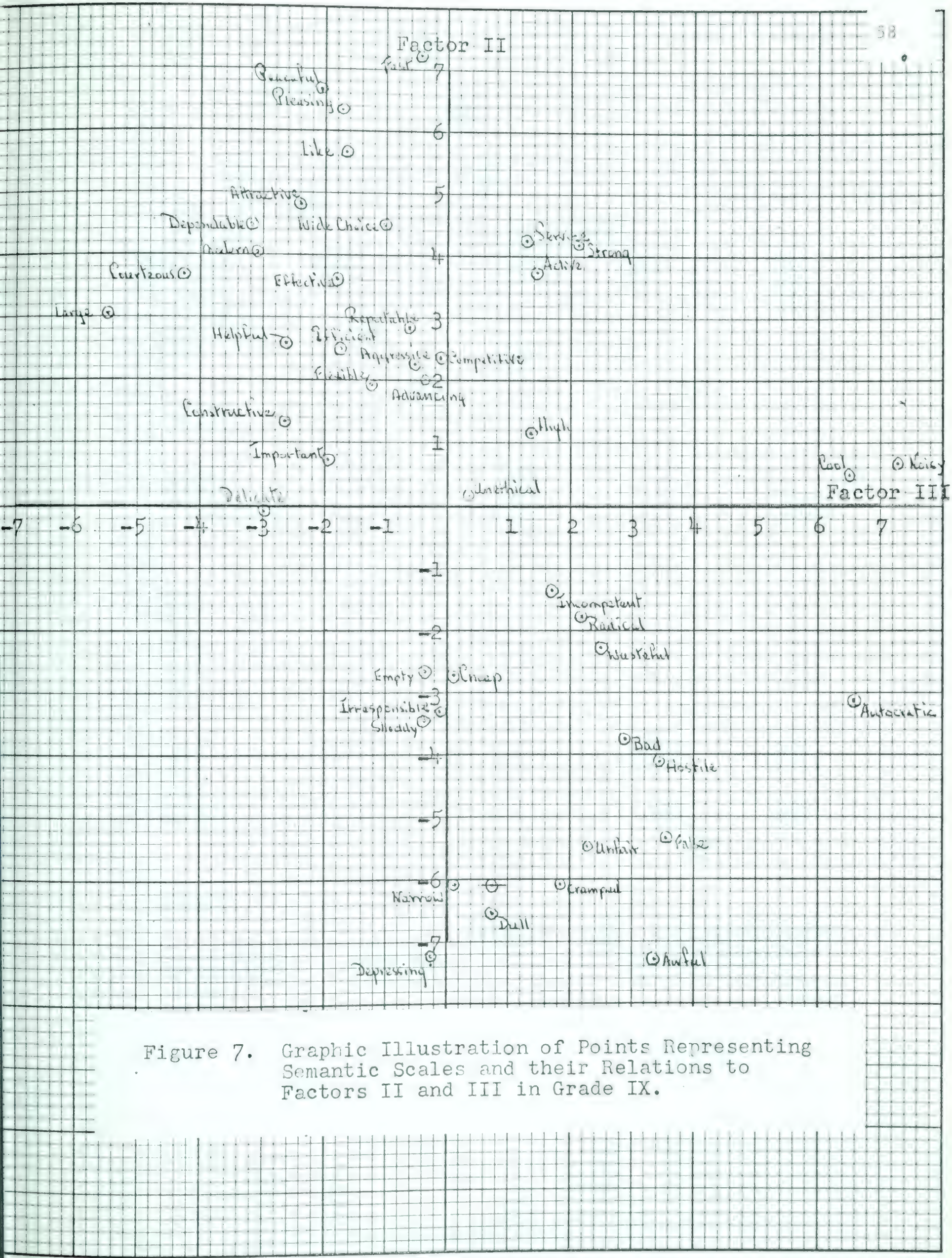

Figure 7. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors II and III in Grade IX.

Table V.

LOADINGS OF SCALES DEFINING FACTOR II FOR GRADE IX

Scale	Varimax Factor Loading			h_j^2
	Factor II	Factor I	Factor III	
Like (E) *	.564	-.420	-.165	.522
Dull (P)	-.658	.244	.077	.498
Unfair (E)	-.548	.324	.231	.459
Pleasing (E)	.636	-.432	-.176	.622
Cramped (A)	-.602	.291	.183	.481
False (E)	-.528	.354	.356	.531
Awful (E)	-.728	.254	.335	.707
Attractive (E)	.482	-.278	-.240	.367
Dependable (P)	.448	-.478	-.320	.532
Peaceful (E)	.667	-.337	-.204	.600
Fast (A)	.727	-.122	-.045	.545
Narrow (A)	-.606	.152	.007	.390
Depressing (A)	-.724	.281	-.022	.604

* Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

The scales with highest loadings were examined further in order to determine what quality was common to all. It seemed that each scale was used in a manner which suggested or related to the quality of the "on-going" school activities in which the student subjects were involved. Each scale appeared to relate particularly to the way in which these activities affected the students. Factor II has therefore been named the Affective factor.

The degree of relationship existing between scales and factor is indicated in the graphs of Figures 5 and 7.

Factor III with a sum of squares of 3.372 accounts for 7.5% of total variance. The scales with heaviest loadings on this factor are LARGE (+), NOISY (-), MODERN (+), COURTEOUS (+), FALSE (-), AWFUL (-), COOL (-), AUTOCRATIC (-), and HOSTILE (-). These scales, their rotated loadings and communalities are listed in Table VI.

The scales are almost equally divided among Osgood's three major characteristics, and as used in this study they appear to connote an atmospheric quality which is related to the classroom environment. The third factor has therefore been called a Class Atmosphere factor.

The value of each scale and the degree of its relationship with Factor III is illustrated in Figures 6 and 7.

In summary, the first three factors extracted in the Grade IX group are different from Osgood's three major dimensions. While the characteristics of Osgood's dimensions appear as components of the actual factors found, at best they only tend to characterize those factors, not delimit them.

Table VI.

LOADINGS OF SCALES DEFINING FACTOR III FOR GRADE IX

Scale	Varimax Factor Loading*			h_j^2
	Factor III	Factor I	Factor II	
Large (P) **	.554	.053	-.303	.402
Noisy (A)	-.728	-.060	-.068	.538
Modern (E)	.311	.135	-.401	.276
Courteous (E)	.428	.447	-.374	.523
False (E)	-.356	-.354	.528	.531
Awful (E)	-.335	-.254	.728	.707
Cool (A)	-.649	-.193	-.047	.461
Autocratic (P)	-.657	.067	.313	.534
Hostile (A)	-.342	-.302	.407	.374

* Signs reflected.

** Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

In all three factors extracted there is a predominantly Evaluative emphasis with Potency and Activity elements appearing as lesser components of each factor. It is evident therefore that the meaning of SCHOOL to Grade IX students is determined in considerable part by a predominantly Evaluative frame of reference which can be considered at this level as fractionated into the three dimensions called Potency, Class Atmosphere, and Affective.

The explanation for the predominance of the Evaluative element was suggested earlier as a cultural semantic bias. It may also result from the measurement of the highly Evaluative concept SCHOOL. It has been found that when a concept is highly Evaluative there has often been scale interaction with the concept in such a way as to cause a shift in the meaning of scales from Potency or Activity to Evaluative character. This appears to have happened in the present study.

It may also be true that a general Evaluative factor has been broken down into more specific Evaluative factors in this study. These specific factors may then be further characterized by the so-called Potency or Activity components. This is an area in which more study needs to be done in order to find scales which will discriminate to a larger degree among the factors isolated.

Grade XI Group: The first five rotated factors in this subject group account for 47.7% of the total variance and the first three of these account for 37.4% of the variance. These three prime factors are examined below.

Factor I with a sum of squares of 6.503 accounts for 14.5% of total variance. The scales with heaviest loadings on this factor (with their signs shown in parenthesis) are LIKE (+), PLEASING (+), INCOMPETENT (-), IMPORTANT (+), ATTRACTIVE (+), CONSTRUCTIVE (+). FAST (+), ADVANCING (+), SHODDY (-), HELPFUL (+), REPUTABLE (+), IRRESPONSIBLE (-), BAD (-), EFFICIENT (+), CHEAP (-), and EFFECTIVE (+). These scales, their rotated loadings and communalities are listed in Table VII. (Similar data for other test scales is presented in Appendix II.)

As found in the examination of the Grade IX factors, the scales associated with Factor I in Grade XI are also related to all three of Osgood's principal dimensions; and again the Evaluative component is dominant. Also, as in the Grade IX group, Factor I exhibits an Evaluative-Potency polarity and in the interest of brevity is called the Potency factor. Furthermore, to distinguish it from the second factor in Grade XI it is called Potency I.

There is little doubt that the quality of meaning which is being measured is very similar in both groups. This is demonstrated by the selection of scales with high loadings on Factor I which are shown in Table VII and also by the comparison of scales and loadings shown in Table XV. The similarity of the two Potency factors of Grades IX and XI is further demonstrated by the coefficient of congruence which has been calculated for them and which yielded a value of 0.87.[49]

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[49]The coefficient of congruence has been calculated according to method described in work by Harry H. Harmen, Modern Factor Analysis, Chicago, University of Chicago Press, 1960, pp. 256-259.

Table VII.

LOADINGS OF SCALES DEFINING FACTOR I FOR GRADE XI

Scale	Varimax Factor Loading			h_j^2
	Factor I	Factor II	Factor III	
Like (E) *	.666	.127	-.406	.625
Pleasing (E)	.480	.183	-.652	.689
Incompetent (P)	-.474	-.537	.105	.524
Important (E)	.745	.206	-.159	.623
Attractive (E)	.636	.004	-.347	.525
Constructive (P)	.621	.226	-.077	.443
Fast (A)	.449	.337	-.228	.369
Advancing (A)	.423	.327	-.163	.312
Shoddy (E)	-.401	-.433	.259	.415
Helpful (P)	.628	.280	-.022	.473
Reputable (E)	.483	.392	-.046	.389
Irresponsible (E)	-.453	-.643	-.020	.619
Bad (E)	-.595	-.378	.350	.619
Efficient (P)	.449	.451	-.302	.496
Cheap (P)	-.554	-.150	.028	.330
Effective (E)	.674	.363	-.104	.596

* Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

Graphic plots indicating the distribution of the points representing semantic scales about Factor I are presented in Figures 8 and 9.

Factor II with a sum of squares of 5.487 accounts for 12.2% of total variance. The scales with heaviest loadings on this factor are UNFAIR (-), FALSE (-), FLEXIBLE (+), AGGRESSIVE (+), INCOMPETENT (-), AUTOCRATIC (-), DEPENDABLE (+), PEACEFUL (+), UNETHICAL (-), HOSTILE (-), SHODDY (-), REPUTABLE (+), COMPETITIVE (+), IRRESPONSIBLE (-), WASTEFUL (-), BAD (-), EFFICIENT (+), SERVICE (+), STRONG (+), and EFFECTIVE (+). These scales, their rotated loadings and communalities are presented in Table VIII. It appears that Factor II is another Evaluative-Potency factor which has been called, for brevity, the Potency II factor.

A coefficient of congruence calculated for Potency II and the Grade IX Potency factor yielded a value of 0.81. This coefficient along with the coefficient of 0.87 obtained between Potency I and the Grade IX Potency factor indicates the degree of similarity existing among the three Potency factors of the two student groups.

In Osgood's terms both Grade XI Factors I and II measure the Potency dimension and although no distinctly distinguishing verbal labels have been found for these two Potency factors the scales characterizing each one are sufficiently different to distinguish different qualities. It may be argued for example that the selection of scales related to Potency I suggests the socially expected

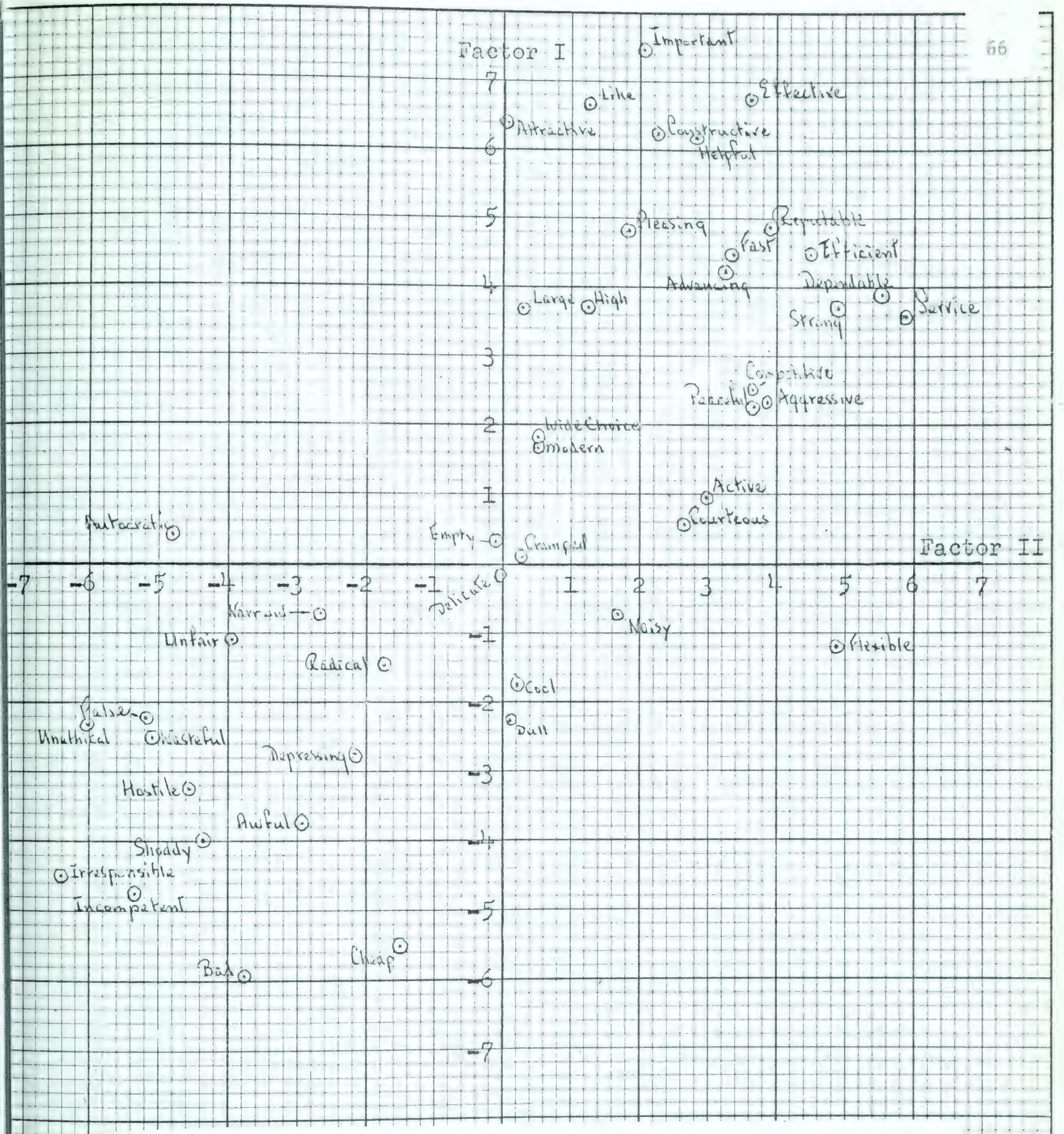

Figure 8. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors I and II in Grade XI.

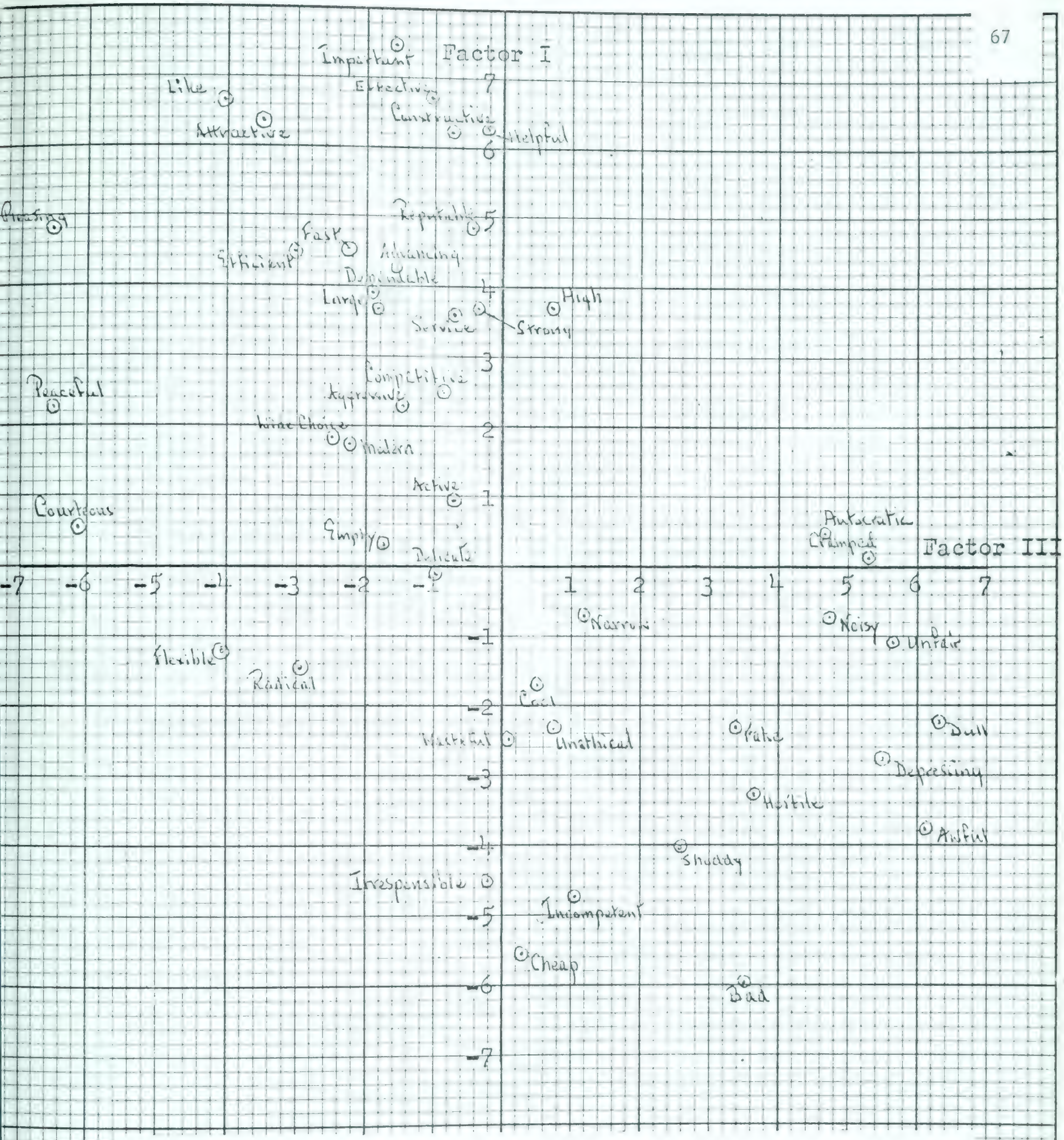

Figure 9. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors I and III in Grade XI.

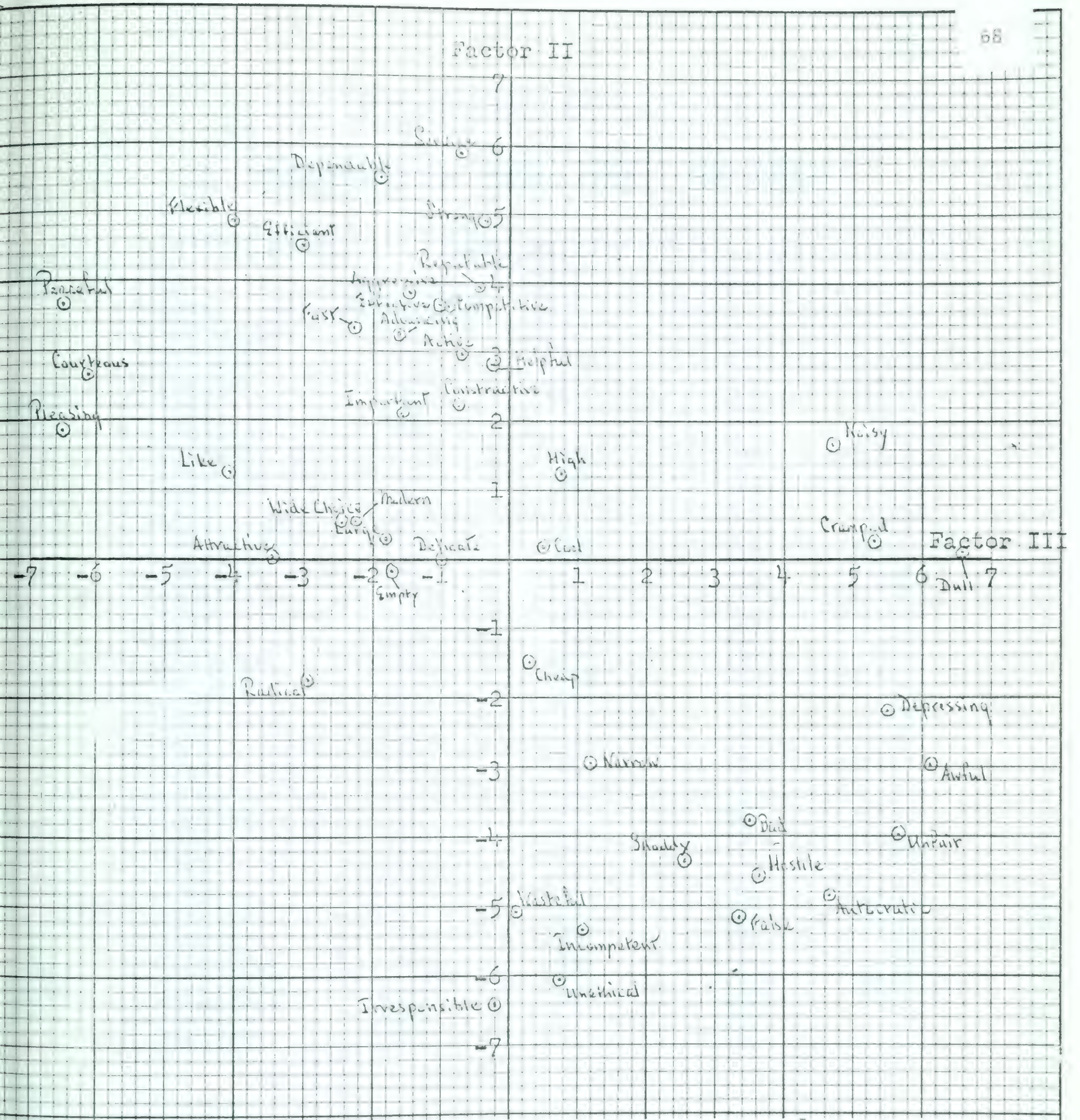

Figure 10. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors II and III in Grade XI.

Table VIII

LOADINGS OF SCALES DEFINING FACTOR II FOR GRADE XI.

Scale	Varimax Factor Loading			h_j^2
	Factor II	Factor I	Factor III	
Unfair (E) *	-.396	-.107	.567	.490
False (E)	-.518	-.234	.339	.438
Flexible (P)	.488	-.122	-.403	.415
Aggressive (A)	.387	.232	-.145	.225
Incompetent (P)	-.537	-.474	.105	.524
Autocratic (P)	-.482	.041	.465	.450
Dependable (P)	.554	.388	-.192	.494
Peaceful (E)	.365	.225	-.648	.604
Unethical (E)	-.604	-.232	.073	.424
Hostile (A)	-.458	-.327	.362	.448
Shoddy (E)	-.433	-.401	.259	.415
Reputable (E)	.392	.483	-.046	.389
Competitive (P)	.362	.253	-.091	.203
Irresponsible (E)	-.643	-.453	-.020	.619
Wasteful (P)	-.509	-.247	.007	.320
Bad (E)	-.378	-.595	.350	.619
Efficient (P)	.451	.449	-.302	.496
Service (P)	.590	.359	-.070	.482
Strong (P)	.490	.370	-.039	.379
Effective (E)	.363	.674	-.104	.596

* Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

evaluation of the SCHOOL while those related to Potency II[50] suggests an appraisal of the SCHOOL in terms of the education production process.

A comparison of the scales and scale loadings for Potency I and Potency II and the Grade IX Potency factor is presented in Table XV.

Graphic plots of Factor II scales appearing in Figure 8 depict the degree of identity existing between test scales and Grade XI factors Potency I and Potency II. Figure 10 illustrates the same relationships for the second and third Grade XI factors.

Factor III with a sum of squares of 4.818 accounts for 10.7% of total variance. The scales loading most heavily on this factor are LIKE (+), DULL (-), NOISY (-), UNFAIR (-), COURTEOUS (+), PLEASING (+), CRAMPED (-), FLEXIBLE (+), AWFUL (-), AUTOCRATIC (-), PEACEFUL (+), and DEPRESSING (-). These scales, their rotated loadings and communalities are given in Table IX.

Examination of the listed scales reveals most of them to be Evaluative. Furthermore the Evaluative characteristic which they measure appears to relate to the student person and his personal assessment of the SCHOOL. This association of the personal aspect of the school situation appears to be evidenced by heavy loadings on such scales as LIKE, DULL, UNFAIR, PLEASING, AWFUL, ATTRACTIVE, and PEACEFUL. The factor has therefore been labelled the Affective factor.

It has been compared to Factor II in the Grade IX group and a comparison of factor scales and their loadings for the two groups is given in Table XVI. A coefficient of congruence calculated for the two factors yielded a value of 0.81. The similarity of factorial composition appears to be plainly evident.

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[50]The labels Potency I and Potency II are tentative names until it is possible to study the factors further with more definitive scales.

Table IX.

LOADINGS OF SCALES DEFINING FACTOR III FOR GRADE XI.

Scale	Varimax Factor Loading*			h_j^2
	Factor III	Factor I	Factor II	
Like (E) **	.406	-.666	-.127	.625
Dull (P)	-.630	.226	-.011	.448
Noisy (A)	-.474	.073	-.167	.258
Unfair (E)	-.567	.107	.396	.490
Courteous (E)	.612	-.055	-.262	.446
Pleasing (E)	.652	-.480	-.183	.689
Cramped (A)	-.530	-.012	-.028	.282
Flexible (P)	.403	.122	-.488	.415
Awful (E)	-.609	.375	.294	.598
Autocratic (P)	-.465	-.041	.482	.450
Peaceful (E)	.648	-.225	-.365	.604
Depressing (A)	-.548	.276	.219	.424

* Signs reflected.

** Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

Graphic plots of Factor III given in Figures 9 and 10 illustrate the degree of relationship existing between scales and factors.

From the foregoing it is apparent that the meaning of SCHOOL for Grade XI students also is largely determined within an Evaluative frame of reference.

University Group: The five principal factors in the University group account for 46.1% of the total measured variance. The first three of these account for 34.7% of total variance and these three are examined below.

Factor I with a sum of squares of 6.423 accounts for 14.3% of total variance. The scales with heaviest loadings on Factor I (with their signs shown in parentheses) are DULL (-), WIDE CHOICE (+), NOISY (-), UNFAIR (-), COURTEOUS (+), ACTIVE (+), PLEASING (+), CRAMPED (-), FALSE (-), FLEXIBLE (+), AWFUL (-), INCOMPETENT (-), AUTOCRATIC (-), PEACEFUL (+), UNETHICAL (-), HOSTILE (-), IRRESPONSIBLE (-), and DEPRESSING (-). These scales, their rotated loadings and communalities are given in Table X. (Similar data for all 45 test scales is presented in Appendix II.)

As in the other two subject groups these scales involve a mixture of Evaluative, Potency, and Activity scales, and again the emphasis is heavily on the Evaluative component.

The above scales reveal Factor I to be the Affective factor. Its similarity to the Affective factor in the other groups is indicated by the comparison of scales and scale loadings given in Table XVI,

Table X.

LOADINGS OF SCALES DEFINING FACTOR I FOR UNIVERSITY

Scale	Varimax Factor Loading			h_j^2
	Factor I	Factor II	Factor III	
Dull (P) *	-.623	.095	.255	.462
Wide Choice (A)	.674	-.006	-.036	.456
Noisy (A)	-.446	.144	-.075	.225
Unfair (E)	-.778	.005	.132	.623
Courteous (E)	.695	-.362	.140	.637
Active (A)	.563	-.188	-.081	.359
Pleasing (E)	.677	-.168	-.512	.749
Cramped (A)	-.583	-.058	.021	.344
False (E)	-.503	.604	-.202	.659
Flexible (P)	.553	.140	-.274	.400
Awful (E)	-.480	.331	.570	.665
Incompetant (P)	-.447	.250	.279	.340
Autocratic (P)	-.423	-.044	.185	.215
Peaceful (E)	.487	-.364	-.492	.612
Unethical (E)	-.546	.432	-.251	.548
Hostile (A)	-.418	.219	.405	.386
Irresponsible (E)	-.529	.305	.211	.417
Depressing (A)	-.428	.390	.372	.474

* Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

and also by the coefficients of congruence which it obtains with the Affective factor in those groups--Grade IX 0.82, Grade XI 0.86.

Graphic plots of Factor I scales are given in Figures 11 and 12.

Factor II with a sum of squares of 5.917 accounts for 13.1% of total variance. The scales with heaviest loadings on this factor are FALSE (-), IMPORTANT (+), HIGH (+), CONSTRUCTIVE (+), DEPENDABLE (+), UNETHICAL (-), HELPFUL (+), REPUTABLE (+), BAD (-), EFFICIENT (+), SERVICE (+), STRONG (+), and EFFECTIVE (+). These scales, their loadings and communalities are listed in Table XI.

From the scales it can be seen that this is the Evaluative-Potency or more briefly the Potency factor. A comparison of the scale loadings on this factor with the loadings on the Potency factors in the other student groups is given in Table XV. The coefficients of congruence obtained with the Potency factors in the other groups were as follows: with Potency I in Grade XI, 0.85; with Potency II in Grade XI, 0.80 and with the Potency factor in Grade IX, 0.86. These coefficients indicate the degree of similarity existing among the Potency factors found in the three groups.

Factor III with a sum of squares of 3.265 accounts for 7.3% of total variance. The scales with heaviest loadings on this factor are LIKE (+), PLEASING (+), AWFUL (-), EMPTY (-), COOL (-), IMPORTANT (+), ATTRACTIVE (+), PEACEFUL (+), HOSTILE (-), DELICATE (+), and DEPRESSING (-). These scales, their loadings and communalities are given in Table XII.

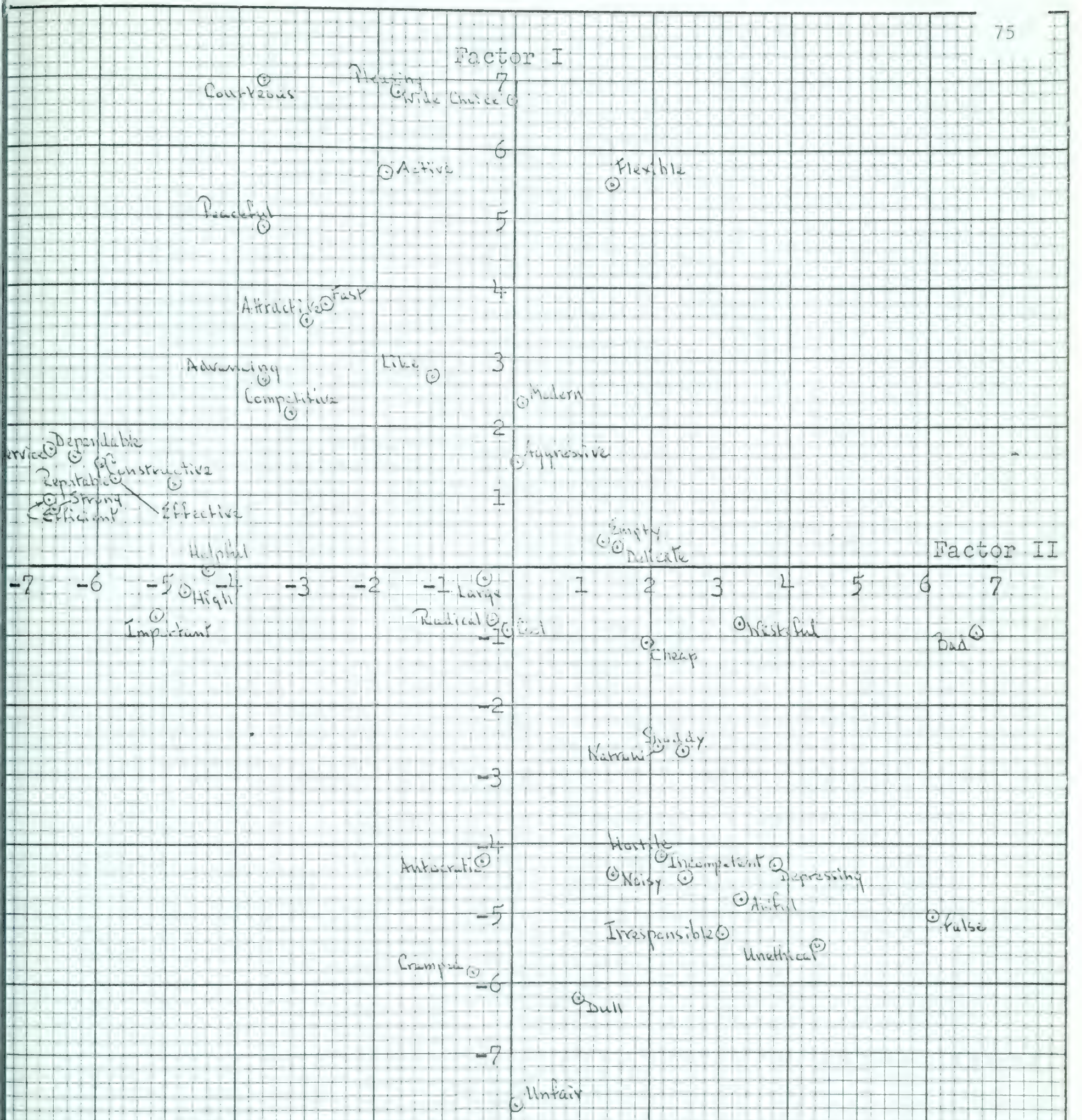

Figure 11. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors I and II in University.

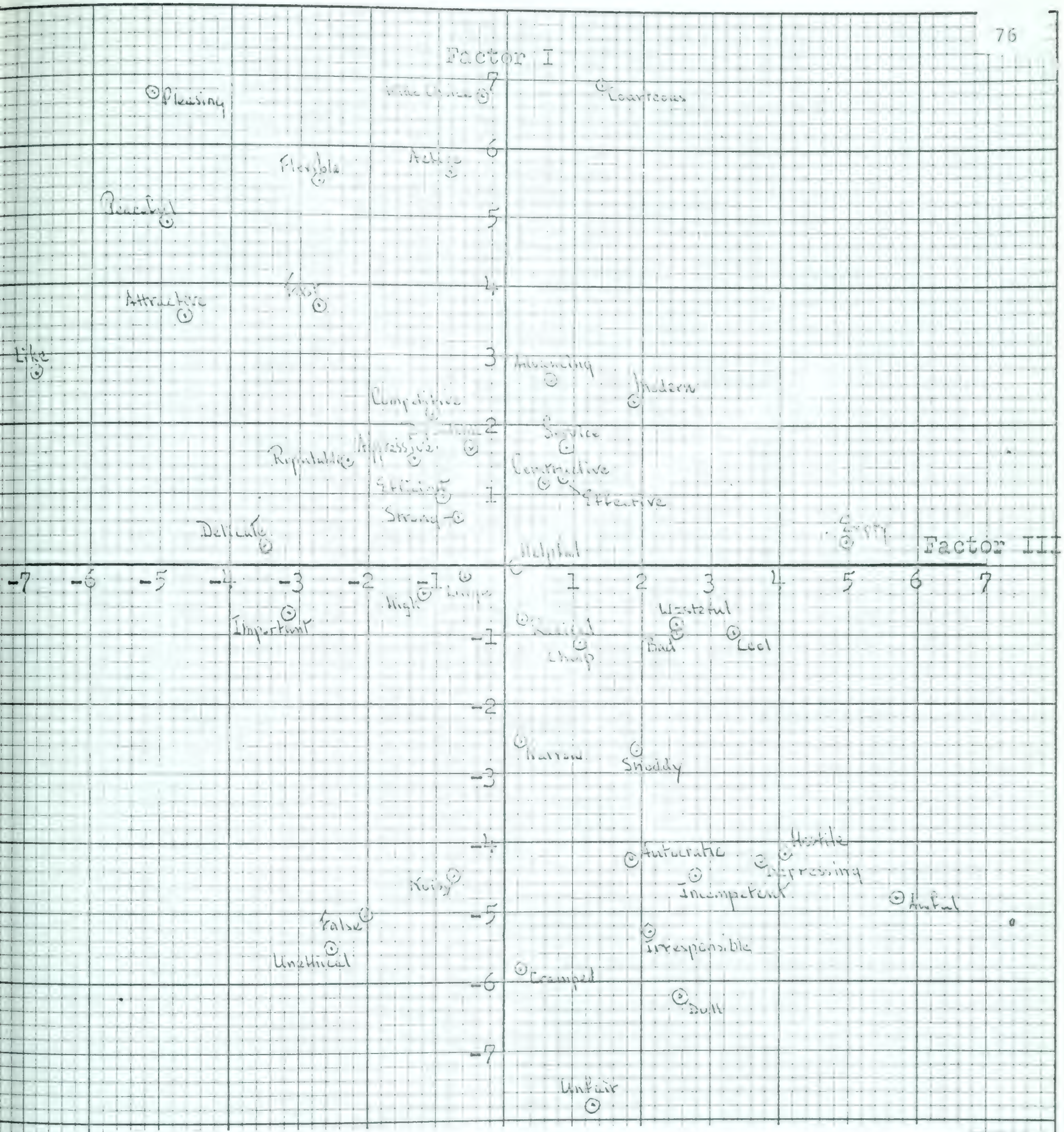

Figure 12. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors I and III in University.

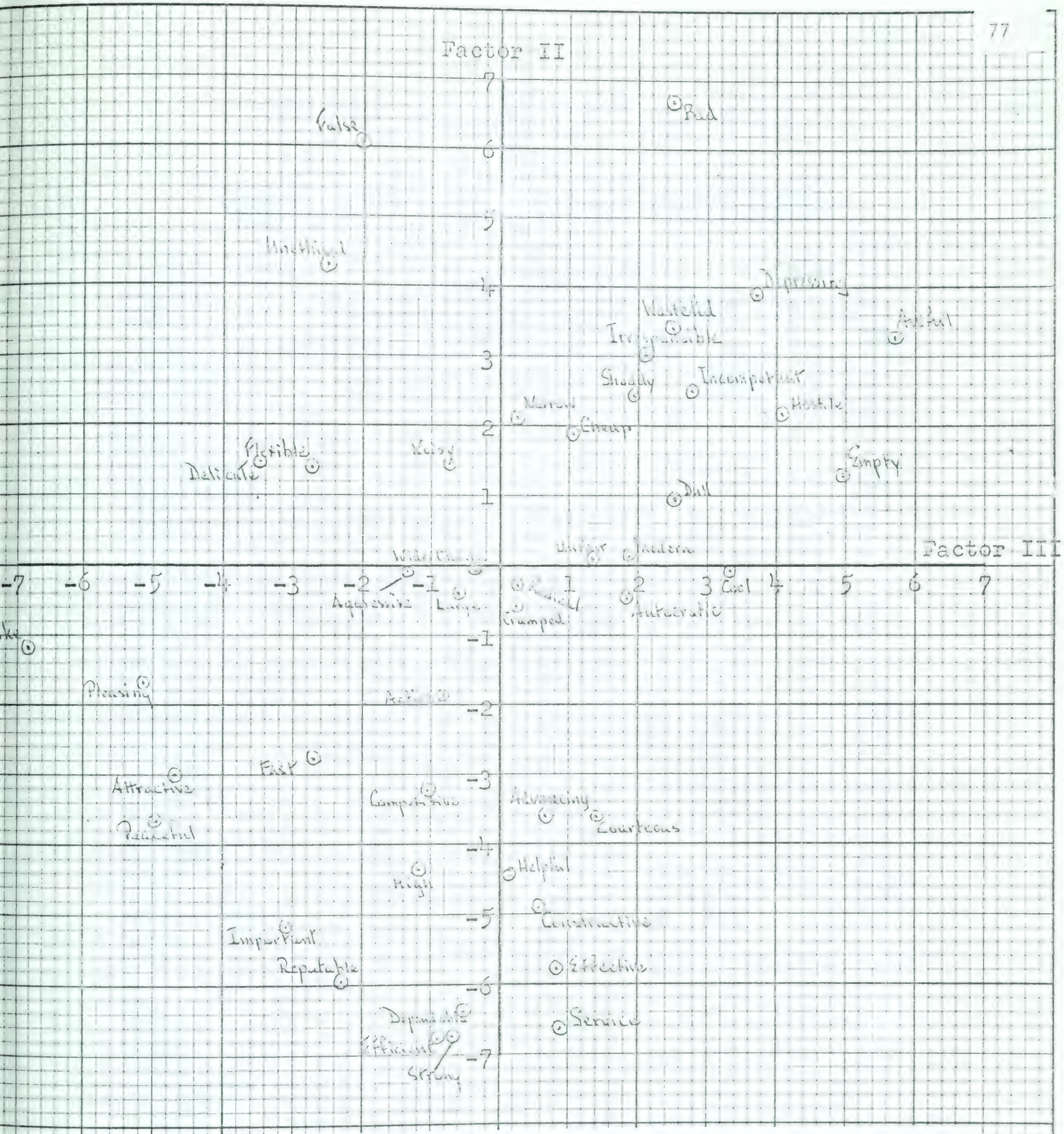

Figure 13. Graphic Illustration of Points Representing Semantic Scales and their Relations to Factors II and III in University.

Table XI.

LOADINGS OF SCALES DEFINING FACTOR II FOR UNIVERSITY

Scale	Varimax Factor Loading*			h_j^2
	Factor II	Factor I	Factor III	
False (E) **	-.604	.503	.202	.659
Important (E)	.516	.069	.312	.368
High (E)	.474	.039	.120	.241
Constructive (P)	.490	-.117	-.057	.257
Dependable (P)	.636	-.155	.051	.431
Unethical (E)	-.432	.546	.251	.548
Helpful (P)	.442	.001	-.015	.196
Reputable (E)	.594	-.145	.230	.427
Bad (E)	-.669	.095	-.255	.521
Efficient (P)	.672	-.097	.089	.469
Service (P)	.664	-.167	-.088	.477
Strong (P)	.667	-.067	.070	.454
Effective (E)	.578	-.130	-.081	.358

* Signs reflected.

** Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

Table XII.

LOADINGS OF SCALES DEFINING FACTOR III FOR UNIVERSITY

Scale	Verimax Factor Loading*			h_j^2
	Factor III	Factor I	Factor II	
Like (E) **	.682	-.271	.120	.553
Pleasing (E)	.512	-.677	.168	.749
Awful (E)	-.570	.480	-.331	.665
Empty (P)	-.496	-.037	-.129	.264
Cool (A)	-.332	.098	.008	.120
Important (E)	.312	.069	.516	.368
Attractive (E)	.465	-.354	.300	.432
Peaceful (E)	.492	-.487	.364	.612
Hostile (A)	-.405	.418	-.219	.386
Delicate (P)	.354	-.028	-.159	.151
Depressing (A)	-.372	.428	-.390	.474

* Signs reflected.

** Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

Factor III also appears to be an Evaluative dimension and the scales which lead most heavily on the factor suggest that an assessment of the school is being made in terms which relate to personal experience or reaction. The factor has therefore been named the Personal factor. It bears some resemblance to the Affective factors of both of the other groups but the coefficients of congruence obtained with each (0.63 with Grade IX and 0.56 with Grade XI) are not large.

Graphic plots of Factor III scales are given in Figures 12 and 13 and illustrate the degree of relationship existing between scales and factors.

The factorial structure of meaning in the University student group has been described as being quite similar to that in the other two groups. A review of these structures and some of the characteristics of each follows in the next section.

III. QUANTITATIVE AND QUALITATIVE COMPARISON OF FACTORIAL STRUCTURE OF MEANING IN THE THREE STUDENT GROUPS

The examination of relationships between selected scales and large factors which was presented above was concerned with the relationships existing within each subject group. What follows is an attempt to make some comparisons of the resulting semantic structures among the three student groups.

It has been shown that one-half of the total measured variance is accounted for by the first five factors extracted.

(Refer to Table III on page 52.) The first three of these factors account for approximately 35% to 41% of total variance. The first factor accounts for an average of 15.4% of variance, the second accounts for an average of 14.0%, and the third accounts for 8.5%. (Table XIII indicates the relative importance of each factor in each student group.)

It is apparent that within each group the two largest factors account for approximately equal amounts of variance--i.e., these factors are about equally important or equally used as dimensions in the expressed meaning of SCHOOL. Usually the third factor accounts for about two-thirds as much variance as the first two. These relationships are clearly shown in Table XIII.

While Table XIII lists the factors in order of magnitude it disregards the qualitative composition of each factor within each student group. Therefore the same factors are relisted in Table XIV where they are classified by quality or type. The significance of this presentation lies in the demonstration of the changed rank order of the first two factors in the University group. In addition Table XIV demonstrates the changes in relative magnitude of each factor across subject groups. For example the Potency factor is paramount in the Grade IX & XI groups but is second in size in the University group.

A discussion of the similarities and differences of factorial composition among the three student groups appears below.

Table XIII.

RELATIVE IMPORTANCE OF THE THREE MAJOR FACTORS

(Amount of Variance Accounted for by Each Factor)

Group	Factor 1	Factor 2	Factor 3	Total %
Grade IX	17.3%	16.6%	7.5%	41.4%
Grade XI	14.5%	12.2%	10.7%	37.4%
University	14.3%	13.1%	7.3%	34.7%

Table XIV.

RELATIVE IMPORTANCE OF THE THREE MAJOR FACTORS

(Amount of Variance Accounted for by Each Factor)

Group	Potency	Affective	Other	Total %
Grade IX	17.3%	16.6%	7.5%	41.4%
Grade XI	14.5%	10.7%	12.2%*	37.4%
University	13.1%	14.3%	7.3%	34.7%

* A second Potency factor.

The Potency Factor: The Potency factor has been named without inclusion of the term Evaluative in the name in spite of the apparently predominantly Evaluative nature of the factor. The reason for the omission of the word Evaluative is that all the factors discussed seem to be primarily Evaluative (in terms of Osgood's scheme of nomenclature) and it seemed that repetitious use of Evaluative in the names of all factors served no useful purpose in distinguishing among the factors. Consequently all factors including the Potency factor have been described according to what seemed to be their secondary distinguishing characteristics.

The Potency dimension isolated in this study has been described as relating to the socially approved expectations regarding the SCHOOL. This dimension is identified as the largest factor in the Grade IX group, it consists of the two largest factors in the Grade XI group, and it is the second largest factor in the University group.

The Potency factors account for from 13.1% to 17.3% of total variance in the three groups, or an average of 15.0%. A comparison of the scales defining this factor and their varimax loadings across subject groups is presented in Table XV.

The isolation of two Potency factors in Grade XI is an interesting but unexpected development. Each of these factors obtains high values in the coefficients of congruence calculated with the Potency factors in Grade IX and University groups and yet the scale content and scale loadings show distinct differences. The high loadings of Potency I scales such as LIKE, PLEASING, IMPORTANT and ATTRACTIVE

Table XV.

COMPARISON OF SCALES

DEFINING THE POTENCY FACTORS IN THE THREE STUDENT GROUPS

	Varimax Factor Loading			
		Grade XI		
Scale	Grade IX	Potency I	Potency II	University
Like (E) *	.420	.666		
Unfair (E)	-.324		-.396	
Courteous (E)	.447		.262	.362
Active (A)	.430		.296	
Pleasing (E)	.432	.480		
False (E)	-.354	-.238	-.518	-.604
Flexible (P)			.488	
Empty (P)	-.676			
Aggressive (A)	.225		.387	
Incompetent (P)	-.483	-.474	-.537	-.250
Important (E)	.692	.745	.206	.516
Attractive (E)		.636		
Constructive (P)	.653	.621	.226	.490
Autocratic (P)			-.482	
Dependable (P)	.478	.388	.554	.636
Peaceful (E)	.337	.255	.365	.364
Unethical (E)	-.586	-.232	-.604	-.432
Advancing (A)	.649	.423	.327	.362
Hostile (A)	-.302	-.327	-.458	-.219
Shoddy (E)	-.357	-.401	-.433	-.244
Helpful (P)	.705	.628	.280	.442
Reputable (E)	.543	.483	.392	.594
Competitive (P)	.247		.362	.323
Irresponsible (E)	-.451	-.453	-.643	-.305
Wasteful (P)	-.204	-.595	-.509	-.333
Bad (E)	-.521		-.378	-.669
Efficient (P)	.646	.449	.451	.672
Radical (E)	-.406			
Service (P)	.553		.590	.664
Strong (P)	.607		.490	.667
Cheap (P)	-.475	.554		
Effective (E)	.598	.674	.363	.578

* Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

suggest a distinctly Evaluative characteristic which does not appear to be so pronounced in the Potency II factor. On the other hand the Potency II factor obtains higher loadings on the Potency scales such as FLEXIBLE, INCOMPETENT, AUTOCRATIC, DEPENDABLE, COMPETITIVE, EFFICIENT, SERVICE, and STRONG. No names could be found to distinguish between these two factors and so they have been referred to as Potency I and Potency II. Also these two factors obtain modest coefficients of congruence (0.72 and 0.71) with the Affective factor in Grade IX. No explanation of this similarity among the factors is offered.

A progressive change in the loading of scales on the Potency factors is evident from Grade IX to University. The Potency component progressively increases in importance from Grade IX to University as is demonstrated by the loadings on scales such as DEPENDABLE, COMPETITIVE, WASTEFUL, EFFICIENT, SERVICE, and STRONG. At the same time the Activity component becomes less important as is illustrated by the decreasing loading values on such scales as ACTIVE, AGGRESSIVE, ADVANCING, and HOSTILE. Thus this factor appears to take on progressively more of the Potency characteristic and less of Activity or Evaluative characteristics in the older student groups. In the University group the Evaluative characteristic appears to have lost much of the prominance which it obtains in the other two groups. This is demonstrated by the low loadings on scales such as LIKE, UNFAIR, PLEASING and others.

No explanation is offered for this development other than the suggestion that older students have been able to make more discriminatory use of the scales defining the Potency factor to the point where more of the Potency characteristic is involved in the use

of this dimension and less of the Evaluative and Activity characteristics.

The progressively decreasing importance of the Activity characteristic from Grade IX to University may relate to the decreasing importance of "gang" activities in the older age groups. A greater desire for acceptance by the social group and the pressures to conform in group activity, probably still great at the Grade IX age, might prompt greater awareness of what is socially approved and expected and might offer some explanation for the relative importance of the Activity characteristic in the Potency factor in this age group. Consequently the seemingly greater emphasis of the Activity characteristic may be a reflection of the desire for social acceptance with an apparent structuring of meaning in terms of what is socially approved.

To demonstrate the similarity of the Potency factor across subject groups coefficients of congruence have been calculated for the three groups and these have been presented in Table XVII. The range of values, from 0.80 to 0.87, indicates the high degree to which these factors appear to measure the same quality of meaning for the student groups.

The Affective Factor: The Affective factor has been defined as that dimension which gives a measure of the meaning of SCHOOL in terms that appear to relate to the on-going activities in the school. It appears to have a high predominence of the Evaluative characteristics.

The Affective factor accounts for from 10.7% to 16.6% of the total variance or an average of 13.9%. The scales characterizing the Affective factor have already been detailed above but a comparison of the relative importance of each scale across subject groups is presented in Table XVI.

Table XVI.

COMPARISON OF SCALES

DEFINING THE AFFECTIVE FACTOR IN THE THREE STUDENT GROUPS

Scale	Varimax Factor Loading		
	Grade IX	Grade XI	University
Like (E) *	.564	.406	
Dull (P)	-.658	-.630	-.623
Wide Choice (A)			.674
Noisy (A)		-.474	-.446
Unfair (E)	-.548	-.567	-.778
Courteous (E)		.612	.695
Active (A)			.563
Pleasing (E)	.636	.652	.677
Cramped (A)	-.602	-.530	-.583
False (E)	-.528	-.339	-.503
Flexible (P)		.430	.553
Awful (E)	-.728	-.609	-.480
Incompetent (P)			-.447
Attractive (E)	.482	.347	.354
Autocratic (P)		-.465	-.423
Dependable (P)	.448		
Peaceful (E)	.667	.648	.487
Fast (A)	.727		.372
Unethical (E)			.546
Advancing (A)	.200		.264
Hostile (A)	-.407	-.362	-.418
Shoddy (E)	-.345		-.267
Helpful (P)	.260		
Reputable (E)	.286		
Narrow (A)	-.606		-.253
Irresponsible (E)	-.335		-.529
Bad (E)	-.376		
Efficient (P)	.252		
Depressing (A)	-.724	-.548	-.428
Cheap (P)	-.277		
Effective (E)	.362		

* Letter in parenthesis indicates Osgood's factor believed to be represented by the scale; A=Activity, E=Evaluative, P=Potency.

This table reveals that LIKE is apparently an unimportant Affective indicator in the University group but that the scales WIDE CHOICE, ACTIVE, INCOMPETENT, and UNETHICAL are important Affective measures in this group. The table also demonstrates that the so-called Activity scales WIDE CHOICE, ACTIVE, FAST, ADVANCING, HOSTILE, and NARROW are not highly related to the Affective factor and therefore are not important in the definition of the Affective factor in Grade XI.

Numerous such differences in scale content and in the factor loadings of individual scales support the following general conclusions.

The Affective factor in the Grade IX and University groups contains a significantly larger Activity component than it does in the Grade XI group.

The importance of the Activity characteristic in the Grade IX group may reflect a continuation of adolescent "gang" activity in this age group, while in the University group it may reflect the socializing of that age group. The lesser importance of the Activity component in the Grade XI group may relate to a development away from the gang of the junior high school and toward a developing "self" concept. This explanation is supported by the personal connotation of such high loading scales as COURTEOUS, PLEASING, AWFUL, AUTOCRATIC, PEACEFUL, and DEPRESSING.

Coefficients of congruence calculated for the Affective factors in the three student groups are presented in Table XVII. These values range from 0.81 to 0.86 and indicate a fairly high degree of similarity among the Affective factors of the three groups. It appears that substantially the same factor is being measured in each subject group.

Table XVII.

COEFFICIENTS OF CONGRUENCE FOR POTENCY AND AFFECTIVE FACTORS

(Three Student Groups)

	Grade XI.		
Potency Factor	Potency I	Potency II	University
Grade IX	0.87	0.81	0.86
Grade XI - Potency I			0.85
- Potency II			0.80

Affective Factor	Grade XI.	University
Grade IX	0.81	0.82
Grade XI		0.86

Other Factors: The third factor in the Grade IX group is assumed to relate to Class Atmosphere. This label is supported by the high loadings demonstrated by such scales as LARGE, NOISY, COOL, and AUTOCRATIC. This factor appears to present a dimension which is quite different from any other in the other student groups.

The third factor in the University group has been called the Personal factor because it appears to give an Evaluative measure of the concept SCHOOL in terms which suggest a personal connotation for the individual. This factor seems to reflect an increased ego-centricism which relates the meaning of SCHOOL to the student person.

Conclusions: A considerable dimensional stability, and considerable consistency in factorial structure of the meaning of SCHOOL, has been identified across the three groups studied. Also demonstrated was a progressive change and development in the content of the major factors from one group to another. This would indicate that although the dimensions of the meaning of SCHOOL undergo quantitative and qualitative change from Grade IX to University the semantic structures within which the development takes place are very similar.

IV. SUMMARY

Four distinct major factors have been isolated and identified as operative in student judgements of the meaning of the concept SCHOOL. These have been described as Potency, Affective, Class Atmosphere, and Personal factors.

In each student group the three major factors together account for approximately 35% to 41% of total measured variance. The first two (Potency and Affective factors) are approximately equal in magnitude accounting for about 15% and 14% of total variance, and the third is usually about one-half to two-thirds the size of the first two.

The order of magnitude proceeds from the Potency factor as the most important (accounting for most variance in meaning) to the Affective and then the Personal and Class Atmosphere factors. The relative importance of each factor within each group has been given in Table XIV and is illustrated in Figure 14.

Since the total amount of variance accounted for by the three largest factors in each group diminishes progressively from the Grade IX to the University groups, this would indicate that in the older age group relatively more use is made of other smaller dimensions in making judgements of the SCHOOL. Hence the Grade IX group expresses the meaning of SCHOOL in terms of fewer principal factors and to this extent exhibits a simpler semantic structuring of the concept than do the other two groups.

None of the major factors can be purely identified with Osgood's three major dimensions of meaning and this would indicate that Osgood's labels have not proven to be appropriate in the judgements of the meaning of SCHOOL as expressed in this study. Apparently different labels are to be preferred when the concept SCHOOL is investigated.

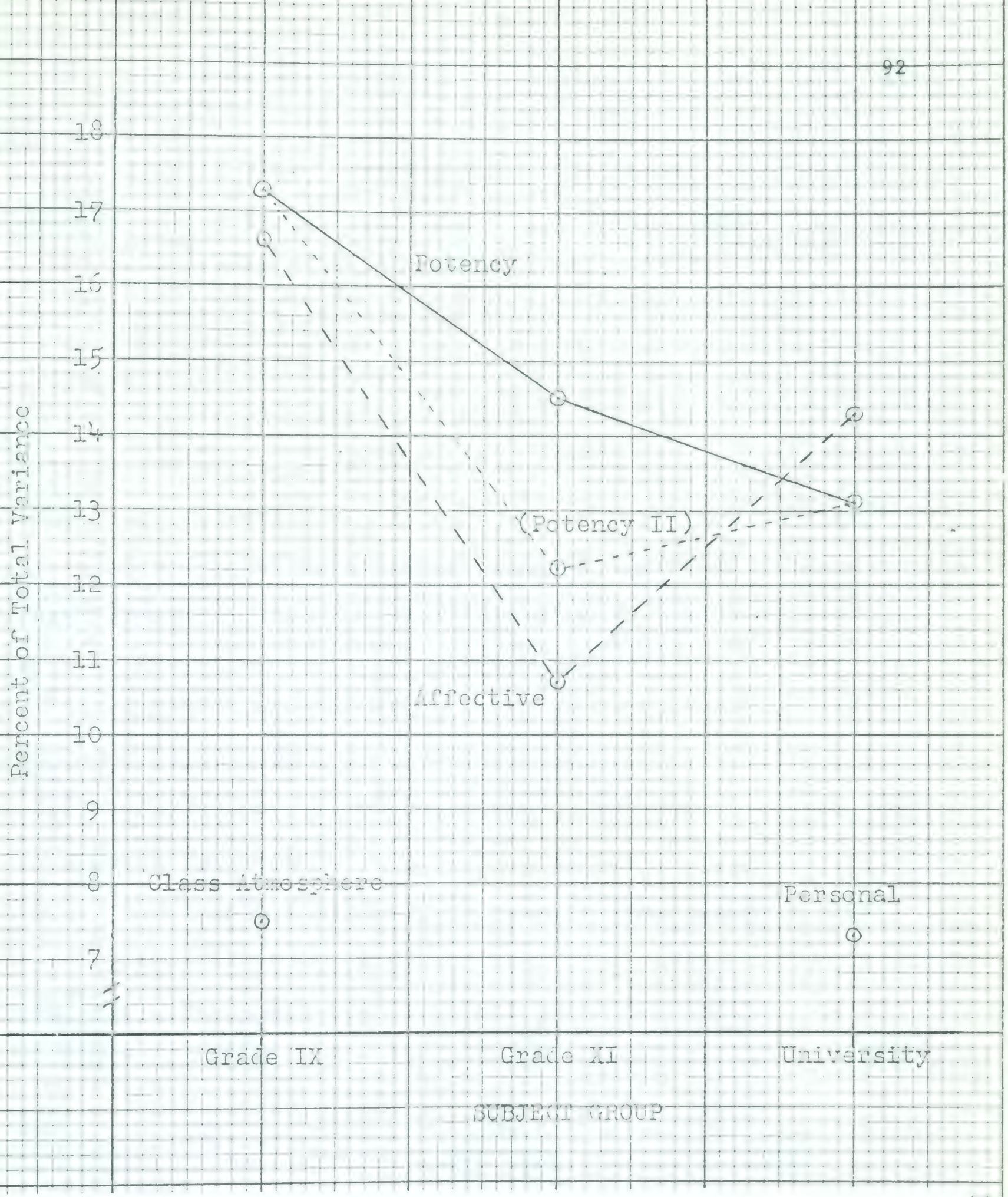

Figure 14. Relative Importance of the Three Major Factors in each Subject Group (Percent of total variance accounted for by each factor).

The Evaluative component in all three factors was so large as to warrant the conclusion that there is a dominant characteristic attribute functioning within an Evaluative frame of reference in these judgements of the meaning of SCHOOL.

If such a frame of reference exists then it is also possible that the meanings of many scales may have shifted toward parallelism with the dominant characteristic attribute of the concept SCHOOL. This would not be surprising in view of the Evaluative nature of the concept itself and in view of the nature of evaluation which tends to become a highly generalizable attribute and which may align itself with almost any dimension of meaning, as it appears to have done in this study.

Furthermore it appears as though this generalized Evaluative quality or characteristic may have been broken down into more specific characteristics which have been detected and described as components of the major factors.

The possible existence of a number of other smaller factors could be investigated if a different selection of scales were used. The particular selection of scales in the present study may have been such that these scales are relatively easily aligned with the Evaluative dimension. Another study could well investigate this particular problem and attempt to discover scales which could provide more discriminatory or discreet measures of the various factors.

It is also possible that the existence of an attitudinal set on the part of the student groups might predispose the subjects to respond in Evaluative terms. Consequently all factors would be

given considerable Evaluative determination. The effects of such an attitudinal set would present another problem for future investigators.

Finally, the change in the factorial structure over the three groups is both quantitative and qualitative. The meaning of SCHOOL while quite similar for the three subject groups is nevertheless measurably different.

CHAPTER VI

CONCLUSIONS

1) Distinctive factors or dimensions of meaning can be isolated, identified and their importance measured. Since dimensions of the semantic space appeared which were consistent with Osgood's theoretical position and which in addition were psychologically meaningful the use of the semantic differential and factor analytic techniques appeared to be justified.

2) The meaning of SCHOOL may be largely expressed in terms of a small number of semantic dimensions or factors which appear to be predominantly Evaluative in character.

3) There is progressive change in the factorial structures of meaning indicated by the responses of the three student groups. The younger students exhibit parsimonious semantic structuring by the comparatively greater reliance on a few major factors whereas the older students, though placing much reliance on factors having the same qualities as those used by younger students, depend comparatively more on other dimensions in judgements of the SCHOOL.

It may be inferred that the progressive change in the factorial structure of meaning from one group to another and the use which is made of the various dimensions of meaning bears a relation to the social development of the subjects.

4) None of the factors isolated corresponded exactly with Osgood's three major dimensions although, by definition, they all

exhibited Evaluative, Potency, and Activity characteristics. It appears that Osgood's terms are not appropriate (when defined as independent dimensions) to investigation of the concept SCHOOL

5) The Evaluative component is so highly pervasive that much of the variance in meaning is expressed along what appears to be a predominantly Evaluative characteristic attribute.

Since this characteristic attribute is dominantly Evaluative, the attitudes of the subjects toward SCHOOL may be inferred to be predominantly those of either favorable or unfavorable predisposition.

Although there may be tendencies for students to use other dimensions of meaning these appear to be highly infused by this particular Evaluative predisposition toward SCHOOL.

RECOMMENDATIONS FOR FURTHER STUDY

Future research might be directed toward the selection of "purer" semantic scales. More precise identification of the factorial content of such scales needs to be made in relation to the concept SCHOOL if the school is to be rated.

Further studies could investigate the apparently important area of the characteristic attribute related to the concept SCHOOL. The existence of this characteristic attribute may indicate that other factors, than those defined by the selection of scales in this study, may have more discriminatory capacity if they were used. On the other hand it is possible that the concept SCHOOL may not lend itself readily

to factorial analysis because it may mean many different things to different people.

A study could be made to discover what is the effect of subjects' attitudinal set on their definitions of the SCHOOL.

Another analytical rotation of the factors and generally more sophisticated scaling methods might yield more significant results in another study of the meaning of SCHOOL.

Still other studies might concern themselves with subjects of different age groups--e.g., a third or fourth year University group and an adult group from the community at large. Further analysis might be made of the effects of socio-economic status, geographical distribution (e.g., rural versus urban), sex, religious background, educational status, or vocational background on attitudes toward the SCHOOL.

Some research might be directed toward the practical application of findings from studies such as these. Data could be provided which could be useful in appraising school public relations and the existing image of the school and this could be suggestive of the directions in which changes might be made.

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APPENDIX

APPENDIX I

A STUDY OF ATTITUDES EXPRESSED TOWARD THE SCHOOL

The purpose of this study is to determine attitudes toward the school. You are asked to rate the school on a series of descriptive scales. Please make your judgements on the basis of what the school means to you. Think in terms of the ENTIRE SCHOOL SYSTEM rather than of a particular school. Make your ratings on each of the scales in order.

Here is how you are to use the scales:
If you feel the concept at the top of the page is very closely related to one end of the scale, you should place your check-mark as follows:

fair _X_:___:___:___:___:___:___ unfair

OR

fair ___:___:___:___:___:___:_X_ unfair

If you feel that the concept is quite closely related to one or the other end of the scale (but not extremely), you should place your check-mark as follows:

strong ___:_X_:___:___:___:___:___ weak

OR

strong ___:___:___:___:___:_X_:___ weak

If the concept seems only slightly related to one side as opposed to the other side (but is not really neutral), then you should check as follows:

active ___:___:_X_:___:___:___:___ passive

OR

active ___:___:___:___:_X_:___:___ passive

The direction toward which you check, of course, depends upon which of the two ends of the scale seem most characteristic of the thing you are judging.

If you consider the concept to be neutral on the scale, both sides of the scale equally associated with the concept, or if the scale is completely irrelevant, unrelated to the concept, then you should place your check-mark in the middle space:

safe ___:___:___:_X_:___:___:___ dangerous

IMPORTANT: (1) Place your check-marks in the middle of spaces, not on the boundaries:

THIS NOT THIS

___:_X_:___:___:___:___:___ X

(2) Be sure you check <u>every scale</u> for each concept--DO NOT OMIT ANY.

(3) <u>Never</u> put more than one check-mark on a single scale.

Sometimes you will feel as though you've had the same item before on the test. This will not be the case, so <u>do not look back and forth</u> through the items. Do not try to remember how you checked similar items earlier in the test. MAKE EACH ITEM A SEPARATE AND INDEPENDENT JUDGEMENT. Work at fairly high speed through this test. Do not worry or puzzle over individual items. It is your first impressions, the immediate "feelings" about the items that we want. On the other hand, please do not be careless, because we want your true impressions.

DESCRIPTIVE SCALES

like	___:___:___:___:___:___:___	dislike
large	___:___:___:___:___:___:___	small
dull	___:___:___:___:___:___:___	bright
wide choice	___:___:___:___:___:___:___	narrow choice
noisy	___:___:___:___:___:___:___	quiet
modern	___:___:___:___:___:___:___	old
unfair	___:___:___:___:___:___:___	fair
courteous	___:___:___:___:___:___:___	impolite
active	___:___:___:___:___:___:___	passive
pleasing	___:___:___:___:___:___:___	annoying
cramped	___:___:___:___:___:___:___	spacious
false	___:___:___:___:___:___:___	honest
flexible	___:___:___:___:___:___:___	rigid
awful	___:___:___:___:___:___:___	nice
empty	___:___:___:___:___:___:___	full
aggressive	___:___:___:___:___:___:___	unenterprising
incompetent	___:___:___:___:___:___:___	competent
cool	___:___:___:___:___:___:___	warm
important	___:___:___:___:___:___:___	trivial
attractive	___:___:___:___:___:___:___	repulsive
high	___:___:___:___:___:___:___	low
constructive	___:___:___:___:___:___:___	destructive
autocratic	___:___:___:___:___:___:___	democratic

DESCRIPTIVE SCALES....(Page 2)

dependable	___:___:___:___:___:___:___	undependable
peaceful	___:___:___:___:___:___:___	irritating
fast	___:___:___:___:___:___:___	slow
unethical	___:___:___:___:___:___:___	ethical
advancing	___:___:___:___:___:___:___	declining
hostile	___:___:___:___:___:___:___	friendly
shoddy	___:___:___:___:___:___:___	quality
helpful	___:___:___:___:___:___:___	useless
reputable	___:___:___:___:___:___:___	dishonest
competitive	___:___:___:___:___:___:___	indifferent
narrow	___:___:___:___:___:___:___	wide
irresponsible	___:___:___:___:___:___:___	responsible
wasteful	___:___:___:___:___:___:___	thrifty
bad	___:___:___:___:___:___:___	good
delicate	___:___:___:___:___:___:___	rugged
efficient	___:___:___:___:___:___:___	inefficient
radical	___:___:___:___:___:___:___	traditional
service	___:___:___:___:___:___:___	disservice
depressing	___:___:___:___:___:___:___	exciting
strong	___:___:___:___:___:___:___	weak
cheap	___:___:___:___:___:___:___	expensive
effective	___:___:___:___:___:___:___	ineffective

APPENDIX II

THE ROTATED LOADINGS AND COMMUNALITIES OF THE

45 TEST SCALES FOR THE FIRST THREE GRADE IX FACTORS

Scale	Factor I	Factor II	Factor III	h_j^2
Like	-.420	.564	-.165	.522
Large	-.053	.303	-.554	.402
Dull	.244	-.658	.077	.498
Wide Choice	-.172	.453	-.103	.245
Noisy	.060	.068	.728	.538
Modern	-.135	.401	-.311	.276
Unfair	.324	-.548	.231	.459
Courteous	-.447	.374	-.428	.523
Active	-.430	.377	.143	.347
Pleasing	-.432	.636	-.176	.622
Cramped	.291	-.602	.183	.481
False	.354	-.528	.356	.531
Flexible	-.036	.195	-.123	.054
Awful	.254	-.728	.335	.707
Empty	.676	-.265	-.035	.528
Aggressive	-.358	.226	-.057	.162
Incompetent	.483	-.132	.168	.279
Cool	.193	.047	.649	.461
Important	-.692	.073	-.198	.523
Attractive	-.278	.482	-.240	.367
High	-.174	.115	.137	.062
Constructive	-.653	.136	-.269	.317
Autocratic	-.067	-.313	.657	.534
Dependable	-.478	.448	-.320	.532
Peaceful	-.337	.667	-.204	.600
Fast	-.122	.727	-.045	.545
Unethical	.586	.014	.036	.345
Advancing	-.649	.200	-.034	.462

APPENDIX II - Page 2

Scale	Factor I	Factor II	Factor III	h_j^2
Hostile	.302	-.407	.342	.374
Shoddy	.357	-.345	-.039	.248
Helpful	-.705	.260	-.263	.634
Reputable	-.543	.286	-.062	.380
Competitive	-.247	.237	-.011	.117
Narrow	.152	-.606	.007	.390
Irresponsible	.451	-.335	-.013	.316
Wasteful	.204	-.228	.247	.155
Bad	.521	-.376	.288	.496
Delicate	-.093	-.007	-.300	.099
Efficient	-.646	.252	-.176	.512
Radical	.406	-.176	.219	.244
Service	-.553	.429	.128	.506
Depressing	.281	-.724	-.022	.604
Strong	-.607	.422	.209	.590
Cheap	.475	-.277	.009	.302
Effective	-.598	.362	-.180	.521
	7.778	7.485	3.372	

APPENDIX II - Page 3

THE ROTATED LOADINGS AND COMMUNALITIES OF THE

45 TEST SCALES FOR THE FIRST THREE GRADE XI FACTORS

Scale	Factor I	Factor II	Factor III	h_j^2
Like	.666	.127	-.406	.625
Large	.370	.029	-.183	.171
Dull	-.226	.011	.630	.448
Wide Choice	.184	.050	-.248	.098
Noisy	-.073	.167	.474	.258
Modern	.174	.052	-.227	.085
Unfair	-.107	-.396	.567	.490
Courteous	.055	.262	-.612	.446
Active	.098	.297	-.071	.103
Pleasing	.480	.183	-.652	.689
Cramped	.012	.028	.530	.282
False	-.234	-.518	.339	.438
Flexible	-.122	.488	-.403	.415
Awful	-.375	-.294	.609	.598
Empty	.032	-.018	-.174	.032
Aggressive	.232	.387	-.145	.225
Incompetent	-.474	-.537	.105	.524
Cool	-.172	.021	.048	.032
Important	.745	.206	-.159	.623
Attractive	.636	.004	-.347	.525
High	.369	.125	.073	.157
Constructive	.621	.226	-.077	.443
Autocratic	.041	-.482	.465	.450
Dependable	.388	.554	-.192	.494
Peaceful	.225	.365	-.648	.604
Fast	.449	.337	-.228	.367
Unethical	-.232	-.604	.073	.424
Advancing	.423	.327	-.163	.312

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Scale	Factor I	Factor II	Factor III	h_j^2
Hostile	-.327	-.458	.362	.448
Shoddy	-.401	-.433	.259	.415
Helpful	.628	.280	-.022	.473
Reputable	.483	.392	-.046	.389
Competitive	.253	.362	-.091	.203
Narrow	-.067	-.298	.119	.107
Irresponsible	-.453	-.643	-.020	.619
Wasteful	-.247	-.505	.007	.320
Bad	-.595	-.378	.350	.619
Delicate	-.016	-.001	-.100	.010
Efficient	.449	.451	-.302	.496
Radical	-.144	-.177	-.294	.139
Service	.359	.590	-.070	.482
Depressing	-.276	-.219	.548	.424
Strong	.370	.490	-.039	.379
Cheap	-.554	-.150	.028	.330
Effective	.674	.363	-.104	.596
	6.503	5.487	4.818	

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THE ROTATED LOADINGS AND COMMUNALITIES OF THE

45 TEST SCALES FOR THE FIRST THREE UNIVERSITY FACTORS

Scale	Factor I	Factor II	Factor III	h_j^2
Like	.271	-.120	-.682	.553
Large	-.017	-.041	-.060	.006
Dull	.623	.095	.255	.462
Wide Choice	.674	-.006	-.036	.456
Noisy	-.446	.144	-.075	.225
Modern	.235	.012	.187	.090
Unfair	-.778	.005	.132	.623
Courteous	.695	-.362	.140	.637
Active	.563	-.188	-.081	.359
Pleasing	.677	-.168	-.512	.749
Cramped	-.583	-.058	.021	.344
False	-.503	.604	-.202	.659
Flexible	.553	.140	-.274	.400
Awful	-.480	.331	.570	.665
Empty	.037	.129	.496	.264
Aggressive	.147	-.005	-.135	.043
Incompetent	-.447	.250	.279	.340
Cool	-.098	-.008	.332	.120
Important	-.069	-.516	-.312	.368
Attractive	.354	-.300	-.465	.432
High	-.039	-.474	-.120	.241
Constructive	.117	-.490	.057	.257
Autocratic	-.423	-.044	.185	.215
Dependalbe	.155	-.636	-.051	.431
Peaceful	.487	-.364	-.492	.612
Fast	.372	-.279	-.273	.291
Unethical	-.546	.432	-.251	.548
Advancing	.264	-.362	.065	.205
Hostile	-.418	.219	.404	.386
Shoddy	-.267	.244	.192	.168

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Scale	Factor I	Factor II	Factor III	h_j^2
Helpful	-.001	-.442	.015	.196
Reputable	.145	-.594	-.230	.427
Competitive	.217	-.323	-.104	.162
Narrow	-.253	.211	.024	.109
Irresponsible	-.529	.305	.211	.417
Wasteful	-.083	.333	.247	.179
Bad	-.095	.669	.255	.522
Delicate	.028	.159	-.354	.151
Efficient	.097	-.672	-.089	.469
Radical	-.078	-.029	.022	.007
Service	.167	-.664	.088	.477
Depressing	-.428	.390	.372	.474
Strong	.067	-.667	-.070	.454
Cheap	-.107	.194	.105	.060
Effective	.130	-.578	.081	.358
	6.423	5.917	3.265	

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